FortiSwitch-100

Version 4.0 MR1

User Guide

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FortiSwitch-100 UserI Guide

Version 4.0 MR1

Revision 2

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1 Introduction

1.1 Switch Description

The Fortinet FortiSwitch-100 Ethernet Switch is a modular Gigabit Ethernet backbone switch designed for adaptability and scalability. The switch can utilize up to forty-eight Gigabit Ethernet ports to function as a central distribution hub for other switches, switch groups, or routers. The two built-in combination Gigabit ports support 1000BASE-T or SFP Gigabit connections. The FortiSwitch-100 also provides two types of 10 Gigabit Ethernet interfaces on the optional daughter board, yielding four additional ports: four powered CX4 interfaces in the FS-TRX100-CX4, or four SFP+ interfaces in the FS-TRX100-SFP.

1.2 Features

- Supports 48 10/100/1000BASE-T RJ45 Ethernet ports
- Built-in combination 1000BASE-T/SFP ports
- Supports two different daughter boards
- FS-TRX100-CX4: two four powered CX4 interfaces
- FS-TRX100-SFP: four SFP+ interfaces
- Supports 802.1D STP, 802.1S MSTP, and 802.1w Rapid Spanning Tree for redundant back up bridge paths
- Supports 802.1Q VLAN, GVRP, GMRP, IGMP snooping, 802.1p Priority Queues, Port Channel, port mirroring
- Multi-layer Access Control (based on MAC address, IP address, VLAN, Protocol, 802.1p, DSCP)
- Quality of Service (QoS) customized control
- 802.1x (port-based) access control and RADIUS Client support
- Administrator-definable port security
- Per-port bandwidth control
- IEEE 802.3z and IEEE 802.3x compliant Flow Control for all Gigabit ports
- SNMP v.1, v.2, v.3 network management, RMON support
- Supports Web-based management
- CLI management support
- DHCP Client and Relay support
- DNS Client and Relay support
- Fully configurable either in-band or out-of-band control via RS-232 console serial connection
- Telnet remote control console

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- TraceRoute support
- Traffic Segmentation
- TFTP upgrade
- SysLog support
- Simple Network Time Protocol
- Web GUI Traffic Monitoring
- SSH Secure Shell version 1 and 2 support
- SSL Secure HTTP TLS Version 1 and SSL version 3 support
- ARP support
- IP Routing support
- OSPF support
- RIP v1 and v2 support
- Router Discovery Protocol support
- VLAN routing support
- Virtual Router Redundancy Protocol (VRRP) support
- IP Multicast support
- Protocol Independent Multicast - Dense Mode (PIM-DM) support
- Protocol Independent Multicast - Sparse Mode (PIM-SM) support
- IGMP v1, v2, and v3 support
- DVMRP support
- 10 GE uplink interfaces, CX4 or SFP+ depending on the selected daughter board

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1.3 Front-Panel Components

The front panel of the switch consists of 48 1-Giga interfaces, 4 LED indicators, an RS-232 communication port, and two SFP (Mini-GBIC) Combo ports.

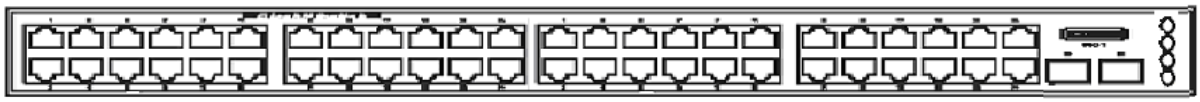

Figure 1 - 1. Front Panel View of the switch

4 LEDs divided into two parts. 2 LED indicators on the upper display the status and power the switch. 2 LED indicators on the lower are used to display the status of SFP interface. An RS-232 DCE console port is for setting up and managing the switch via a connection to a console terminal or PC using a terminal emulation program.

1.4 LED Indicators

2 LED indicators on the upper represent the status and power the switch. 2 LED indicators on the lower are used to display each activity and link status of two SFP interfaces.

1.5 Rear Panel Description

The rear panel of the switch contains an AC power connector and a slot to plug in the 10 GE daughter board.

Figure 1-2. Rear panel view of the Switch

The AC power connector is a standard three-pronged connector that supports the power cord. Plug the female connector of the provided power cord into this socket, and the male side of the cord into a power outlet. The switch automatically adjusts its power setting to any supply voltage in the range from 100 ~ 240 VAC at 50 ~ 60 Hz.

The FortiSwitch-100 ships with one of two different daughter board types that provide the 10 GE uplink interfaces. For the FS-TRX100-CX4, the daughter board provides four powered CX4 interfaces; For the FS-TRX100-SFP it provides four SFP+ interfaces.

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1.6 Management Options

The system may be managed out-of-band through the console port on the front panel or in-band using Telnet, a Web Browser, or SNMP.

1.7 Web-based Management Interface

After you have successfully installed the switch, you can configure the switch, monitor the LED panel, and display statistics graphically using a Web browser, such as Netscape Navigator (version 6.2 and higher) or Microsoft® Internet Explorer (version 5.0).

NOTE: To access the switch through a Web browser, the computer running the Web browser must have IP-based network access to the switch.

1.8 Command Line Console Interface Through the Serial Port or Telnet

You can also connect a computer or terminal to the serial console port or use Telnet to access the switch. The command-line-driven interface provides complete access to all switch management features.

1.9 SNMP-Based Management

You can manage the switch with an SNMP-compatible console program. The switch supports SNMP version 1.0, version 2.0, and version 3.0. The SNMP agent decodes the incoming SNMP messages and responds to requests with MIB objects stored in the database. The SNMP agent updates the MIB objects to generate statistics The switch supports a comprehensive set of MIB extensions:

- RFC1643 Ether-like MIB
- RFC1493 Bridge
- RFC 2819 RMON
- RFC2233 Interface MIB
- RFC2571 (SNMP Frameworks)
- RFC2572 (Message Processing for SNMP)
- RFC2573 (SNMP Applications)
- RFC2576 (Coexistence between SNMPs)
- RFC2618 (Radius-Auth-Client-MIB)
- RFC2620 (Radius-Acc-Client-MIB)
- RFC 1724 (RIPv2-MIB)

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- RFC 1850 (OSPF-MIB)
- RFC 1850 (OSPF-TRAP-MIB)
- RFC 2787 (VRRP-MIB)
- RFC 3289 - DIFFSERV-DSCP-TC
- RFC 3289 - DIFFSERV-MIB
- QOS-DIFFSERV-EXTENSIONS-MIB
- QOS-DIFFSERV-PRIVATE-MIB
- RFC2674 802.1p
- RFC 2932 (IPMROUTE-MIB)
- Fortinet Enterprise MIB
- ROUTING-MIB
- MGMD-MIB
- RFC 2934 PIM-MIB
- DVMRP-STD-MIB
- IANA-RTPROTO-MIB
- MULTICAST-MIB

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2 Installation and Quick Startup

2.1 Package Contents

Before you begin installing the switch, confirm that your package contains the following items:

- One Fortinet FortiSwitch-100 Ethernet switch
- Mounting kit: 2 mounting brackets and screws
- Four rubber feet with adhesive backing
- One AC power cord
- This User's Guide with Registration Card
- CLI Reference
- CD-ROM with User's Guide and CLI Reference

2.2 Switch Installation

2.2.1 **Installing the Switch Without the Rack**

1. Install the switch on a level surface that can safely support the weight of the switch and its attached cables. The switch must have adequate space for ventilation and for accessing cable connectors.
2. Set the switch on a flat surface and check for proper ventilation. Allow at least 5 cm (2 inches) on each side of the switch and 15 cm (6 inches) at the back for the power cable.
3. Attach the rubber feet on the marked locations on the bottom of the chassis.

The rubber feet are recommended to keep the unit from slipping.

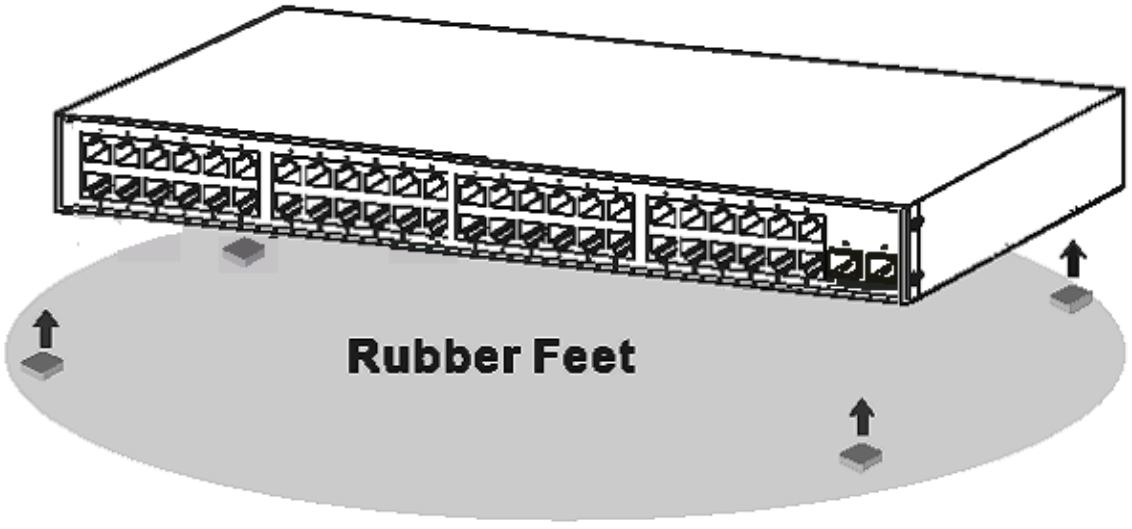

Figure 2-1. Install rubber feet for installations with or without a rack

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2.2.2 **Installing the Switch in a Rack**

You can install the switch in most standard 19-inch (48.3-cm) racks. Refer to the illustrations below.

1. Use the supplied screws to attach a mounting bracket to each side of the switch.
2. Align the holes in the mounting bracket with the holes in the rack.
3. Insert and tighten two screws through each of the mounting brackets.

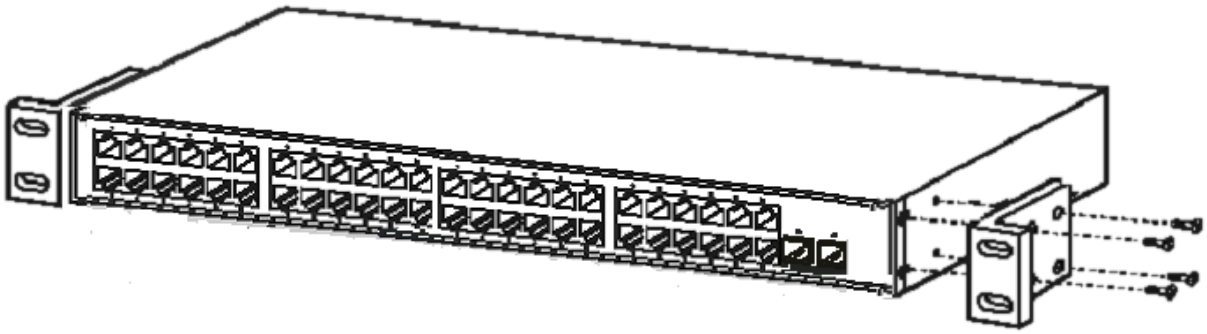

Figure 2-2. Attach mounting brackets

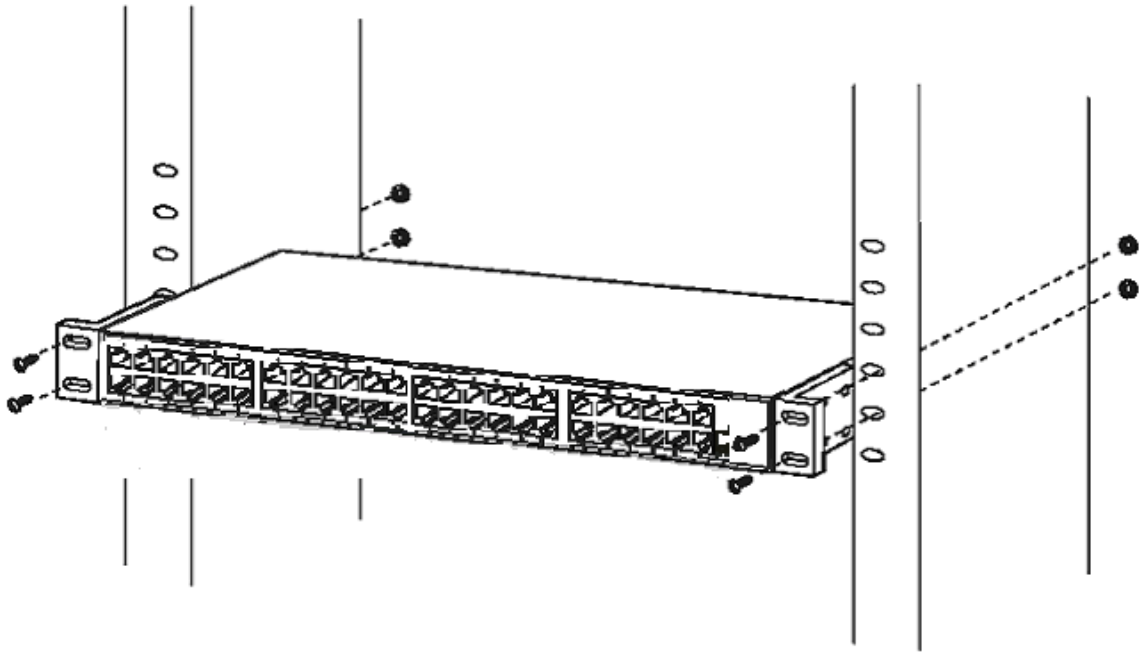

Figure 2-3. Install switch in equipment rack

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2.3 Quick Starting the Switch

1. Read the device Installation Guide for the connectivity procedure. In-band connectivity allows access to the FortiSwitch- 100 switch locally or from a remote workstation. The device must be configured with IP information (IP address, subnet mask, and default gateway).
2. Turn the Power ON.
3. Allow the device to load the software until the login prompt appears. The device initial state is called the default mode.
4. When the prompt asks for operator login, do the following:
    - Type the word admin in the login area. Since a number of the Quick Setup commands require administrator account rights, Fortinet suggests logging into an administrator account.
    - Do not enter a password because there is no password in the default mode.
    - Press the <Enter> key
    - The CLI Privileged EXEC mode prompt will be displayed.
    - Use “configure” to switch to the Global Config mode from Privileged EXEC.
    - Use “exit” to return to the previous mode.

2.4 System Information Setup

2.4.1 **Quick Start up Software Version Information**

Table 2-1. Quick Start up Software Version Information

Command	Details
show hardware	Allows the user to see the HW & SW version the device contains System Description - switch's model name
show switch	Burned in MAC address - MAC address assigned to this switch CPU

2.4.2 **Quick Start up Physical Port Data**

Table 2-2. Quick Start up Physical Port

Command	Details

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show Interface status { <*slot*/*port*> | all }	Displays the Ports slot/port Type - Indicates if the port is a special type of port Admin Mode - Selects the Port Control Administration State Physical Mode - Selects the desired port speed and duplex mode Physical Status - Indicates the port speed and duplex mode Link Status - Indicates whether the link is up or down Link Trap - Determines whether or not to send a trap when link status changes LACP Mode - Displays whether LACP is enabled or disabled on this port Flow Mode - Indicates the status of flow control on this port Cap. Status - Indicates the port capabilities during auto-negotiation

2.4.3 **Quick Start up User Account Management**

Table 2-3. Quick Start up User Account Management

Command	Details
show users	Displays all users that are allowed to access the switch User Access Mode - Shows whether the user is able to change parameters on the switch (Read/Write) or is only able to view (Read Only). As a factory default, admin has Read/Write access and guest has Read Only access. There can only be one Read/Write user and up to 5 Read Only users.
show loginsession	Displays all login session information
username <username> { passwd | nopasswd }	Allows the user to set passwords or change passwords needed to login A prompt will appear after the command is entered requesting the old password. In the absence of an old password leave the area blank. The operator must press enter to execute the command. The system then prompts the user for a new password then a prompt to confirm the new password. If the new password and the

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	confirmed password match a message will be displayed. The user password should not be more than eight characters in length.
copy running-config startup-config [filename]	This will save passwords and all other changes to the device. If you do not save the running config, all changes will be lost when a power cycle is performed on the switch or when the switch is reset. **Notes** • Use of the optional [filename] parameter sets that file name as the system default location for the startup config. The system will now use that file for its startup configuration, and future uses of copy running-config startup-config will copy the running config to the same file. • There is a maximum memory limit of 2 config files; the original system default and one user-created file. To create a new config file, you must first delete any user-created config files from memory. • To configure the switch to boot from a different config file, use the command **boot-system config** <*filename*> where *filename* is the name of the config file from which you want the system to boot (see page 249).

2.4.4 **Quick Start up IP Address**

To view the network parameters the operator can access the device by the following three methods.
• Simple Network Management Protocol - SNMP
• Telnet
• Web Browser

Table 2-4. Quick Start up IP Address

Command	Details

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show ip interface	Displays the Network Configurations IP Address - IP Address of the interface Default IP is 0.0.0.0 Subnet Mask - IP Subnet Mask for the interface Default is 0.0.0.0 Default Gateway - The default Gateway for this interface Default value is 0.0.0.0 Burned in MAC Address - The Burned in MAC Address used for inband connectivity Network Configurations Protocol Current - Indicates which network protocol is being used Default is none Management VLAN Id - Specifies VLAN id Web Mode - Indicates whether HTTP/Web is enabled. *Java Mode - Indicates whether java mode is enabled.*
ip address	(Config)*#interface vlan 1* (if-vlan 1)*#ip address <ipaddr> <netmask>* (if-vlan 1)*#exit* (Config)*#ip default-gateway <gateway>* IP Address range from 0.0.0.0 to 255.255.255.255 Subnet Mask range from 0.0.0.0 to 255.255.255.255 Gateway Address range from 0.0.0.0 to 255.255.255.255 Displays all of the login session information

2.4.5 Quick Start up Uploading from Switch to Out-of-Band PC (Only XMODEM)

Table 2-5. Quick Start up Uploading from Switch to Out-of-Band PC (XMODEM)

Command	Details
copy startup-config <filename> xmodem	This starts the upload and displays the mode of uploading and the type of upload it is and confirms the upload is taking place. For example: If the user is using HyperTerminal, the user must specify where the file is going to be received by the pc.

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2.4.6 Quick Start up Downloading from Out-of-Band PC to Switch (Only XMODEM)

Table 2-6 Quick Start up Downloading from Out-of-Band PC to Switch

Command	Details
copy xmodem startup-config <filename>	Sets the download datatype to be an image or config file. The URL must be specified as: xmodem: filepath/ filename For example: If the user is using HyperTerminal, the user must specify which file is to be sent to the switch. The switch will restart automatically once the code has been downloaded.

2.4.7 Quick Start up Downloading from TFTP Server

Before starting a TFTP server download, the operator must complete the Quick Start up for the IPAddress.

Table 2-7 Quick Start up Downloading from TFTP Server

Command	Details
copy <url> startup-config <filename>	Sets the download datatype to be an image or config file. The URL must be specified as: tftp://ipAddr/filepath/fileName. The startup-config option downloads the config file using tftp and image option downloads the code file.

2.4.8 Quick Start up Factory Defaults

Table 2-8 Quick Start up Factory Defaults

Command	Details
clear config	Enter yes when the prompt pops up to clear all the configurations made to the switch.

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copy running-config startup-config [filename]	Enter yes when the prompt pops up that asks if you want to save the configurations made to the switch.
reload	Enter yes when the prompt pops up that asks if you want to reset the system. You can reset the switch or cold boot the switch; both work effectively.

2.4.9 **Connecting Devices to the Switch**

After assigning IP addresses to the switch, you can connect devices to the switch.

To connect a device to an SFP transceiver port:
1. Use your cabling requirements to select an appropriate SFP transceiver type.
2. Insert the SFP transceiver (sold separately) into the SFP transceiver slot.
3. Use the appropriate network cabling to connect a device to the connectors on the SFP transceiver.

2.4.10 **Updating the Image Code on the Switch**

When the switch is booted up and operational, you can update the image code by following the steps below. If the image download fails, consult the troubleshooting steps at the end of this section.

Note: Images are loaded onto the switch from your local TFTP server, so *start by downloading the appropriate image file* from the Fortinet support portal to your local TFTP server, then follow the steps below.

1. ***Ensure that there is room on the switch for the updated image file***:

First, check the current image and configuration files on the switch by typing the command **dir**:

```
(FortiSwitch-100_238) #dir

      date                    file name          file type startup size (byte)
---------- ------------------------------ -------------- ------- -----------
2007/05/14          b4b-b-0.2.0514.biz Boot-Rom image         Y       127648
2007/11/20                  default.cfg       Config File          N       28701
2008/04/03          lb4w-r-1.04.0403.img Operation Code          Y       8034434
2008/02/21          lb4w-r-1.04.0221.img Operation Code          N       8034610
2008/05/20                      test.2       Config File          Y       29154
```


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```
---------- ------------------------------ -------------- ------- -----------
```

Total: 5 files.

Note whether there is one file with the file type “Operation Code” or two (as in the example above). *If there are two* “Operation Code” files, you must first delete the oldest image file using the following command sequence (inserting the file name of the oldest operation code file in place of the example below):

```
(FortiSwitch-100_238) #delete lb4w-r-1.04.0221.img
Are you sure you want to delete? (y/n) y

Image File "lb4w-r-1.04.0221.img" Deleted!

(FortiSwitch-100_238) #dir

      date                          file name        file type startup size (byte)
---------- ------------------------------ -------------- ------- -----------
2007/05/14                b4b-b-0.2.0514.biz Boot-Rom image         Y        127648
2007/11/20                       default.cfg      Config File          N        28701
2008/04/03                lb4w-r-1.04.0403.img Operation Code        Y       8034434
2008/05/20                             test.2      Config File          Y        29154
---------- ------------------------------ -------------- ------- -----------
```

2. ***Configure an IP address on "interface vlan 1" (if not already configured)****:*

The FortiSwitch-100 must have an IP address in order to communicate with the TFTP server. If one has already been successfully configured on the switch, skip to step 3.

You can give the switch a static IP address manually, or configure a DHCP server to provide an IP address dynamically.

To configure a dynamic IP address using DHCP:

Type the commands shown below to configure the FortiSwitch to acquire an IP address from your DHCP server:

```
(FortiSwitch-100_238) #config
(FortiSwitch-100_238) (Config)#interface vlan 1
(FortiSwitch-100_238) (if-vlan 1)#ip address protocol dhcp
Changing protocol mode will reset ip configuration.
Are you sure you want to continue? (y/n)y
(FortiSwitch-100_238) (if-vlan 1)#exit
(FortiSwitch-100_238) (Config)#exit
```

To manually configure a static IP address:

If you are not using DHCP to automatically assign an IP address to the FortiSwitch, follow the steps below to configure a static IP address on the switch, substituting the appropriate IP address for the example shown. If you do not know what IP address to assign to the switch, contact your IT department.

```
(FortiSwitch-100_238) #config
(FortiSwitch-100_238) (Config)#interface vlan 1
(FortiSwitch-100_238) (if-vlan 1)#ip address protocol none
Changing protocol mode will reset ip configuration.
Are you sure you want to continue? (y/n)y
(FortiSwitch-100_238) (if-vlan 1)#ip address 172.18.21.210 255.255.252.0
```


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Note: When configuring a static IP address, you must also configure a default gateway. Use the following commands, substituting the appropriate default gateway address for the example:

```
(FortiSwitch-100_238) (if-vlan 1)#exit
(FortiSwitch-100_238) (Config)#ip default-gateway 172.18.20.1
(FortiSwitch-100_238) (Config)#ex
(FortiSwitch-100_238) #show ip interface

IP Address..... 172.18.21.210
Subnet Mask..... 255.255.252.0
Default Gateway..... 172.18.20.1
Burned In MAC Address..... 00:1B:24:1D:DD:39
Network Configuration Protocol Current..... None
DHCP Client Identifier TEXT..... Default
Management VLAN ID..... 1
Web Mode..... Enable
Web Port..... 80
Java Mode..... Enable
```

3. ***Use the "TFTP" function to upgrade the code***:
Once an IP address has been configured on the FortiSwitch, use the **copy** command on the FortiSwitch to copy the image file via TFTP. Type the command below, substituting the appropriate IP address and file path for those shown in the example.
Note:

- The IP address is the address of the local TFTP server from which you're downloading the image file.
- When you type the file path, do not include the root!

```
(FortiSwitch-100_238) #copy tftp://10.10.10.30/Releases/TrxOS/1.08/lb4w-r-1.08.0819.img image
lb4w-r-1.08.0819.img

Mode..... TFTP
Set TFTP Server IP..... 10.10.10.30
TFTP Path.....
TFTP Filename..... lb4w-r-1.08.0819.img
Data Type..... Code

Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y

TFTP code transfer starting

Verifying CRC of file in Flash File System

TFTP receive complete... storing in Flash File System...

File transfer operation completed successfully.
```

4. ***Next, display all of the files (including the new run time code) using the "dir" command***:

```
(FortiSwitch-100_238) #dir

      date                    file name       file type startup size (byte)
```


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```
---------- ------------------------------ ------------- ------- -----------
2007/05/14                b4b-b-0.2.0514.biz Boot-Rom image         Y       127648
2007/11/20                       default.cfg      Config File          N       28701
2008/04/03                lb4w-r-1.04.0403.img Operation Code         Y      8034434
2008/08/19                lb4w-r-1.08.0819.img Operation Code         N      8039249
2008/05/20                           test.2      Config File          Y       29154
---------- ------------------------------ ------------- ------- -----------
```

Total: 5 files.

5. ***Set boot up code using the following command***:

```
(FortiSwitch-100_238) #boot-system opcode lb4w-r-1.08.0819.img

Start Up Success!
```

6. ***Display all of the files again (start up code should be set to the new runtime code)***:

```
(FortiSwitch-100_238) #dir

      date                          file name        file type startup size (byte)
---------- ------------------------------ ------------- ------- -----------
2007/05/14                b4b-b-0.2.0514.biz Boot-Rom image         Y       127648
2007/11/20                       default.cfg      Config File          N       28701
2008/04/03                lb4w-r-1.04.0403.img Operation Code         N      8034434
2008/08/19                lb4w-r-1.08.0819.img Operation Code         Y      8039249
2008/05/20                           test.2      Config File          Y       29154
---------- ------------------------------ ------------- ------- -----------
```

Total: 5 files.

Now you are finished with the upgrade procedure! Please reload the switch and configure as desired.

Troubleshooting the Download Procedure

If you have configured an IP address (statically or via DHCP) on the FortiSwitch and still cannot download the image file, try the following:

- Verify that the FortiSwitch is able to access the TFTP server by using the **ping** command. Substitute the IP address of your TFTP server for the one shown in the example below:

```
(FortiSwitch-100_238) #ping 10.10.10.31
PING to 10.10.10.31, by 5 32-byte payload ICMP packets, timeout is 3 seconds:

Reply from 10.10.10.31: bytes=32 time=0ms
Reply from 10.10.10.31: bytes=32 time=0ms
Reply from 10.10.10.31: bytes=32 time=0ms
Reply from 10.10.10.31: bytes=32 time=0ms
Reply from 10.10.10.31: bytes=32 time=0ms

Ping statistics for 10.10.10.31 :
        5 packets transmitted, 5 packets received (100%), 0 packets lost (0%)
proximate round trip times:
        Minimum = 0 ms, Maximum = 0 ms, Average = 0 ms
```


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- If there is no response from the TFTP server, verify the IP settings by typing **show ip interface** to ensure that the IP address and default gateway have been entered correctly.
- If the settings are correct but there is still no response from the TFTP server, ensure that the TFTP server is connected to a network which the FortiSwitch can access. The network connection must be made through one of the front ports of the FortiSwitch switch which belongs to VLAN 1.

wit to be an active part of a manageable network. These components include a CPU, memory for data storage, other related hardware, and SNMP agent firmware. Activities on the switch can be monitored with these components, while the switch can be manipulated to carry out specific tasks.

2.5 Set Up your Switch Using Console Access

Out-of-band management requires connecting a terminal, such as a VT-100 or a PC running a terminal-emulation program (such as HyperTerminal, which is automatically installed with Microsoft Windows) to the RS-232 DCE console port of the switch. Switch management using the RS-232 DCE console port is called Local Console Management to differentiate it from management done via management platforms, such as DView or HP OpenView.

Make sure the terminal or PC you are using to make this connection is configured to match these settings. If you are having problems making this connection on a PC, make sure the emulation is set to VT-100 or ANSI. If you still don't see anything, try pressing <Ctrl> + r to refresh the screen.

First-time configuration must be carried out through a console, that is, either (a) a VT100-type serial data terminal, or (b) a computer running communications software set to emulate a VT100. The console must be connected to the Diagnostics port. This is an RS-232 port with a 9-socket D-shell connector and DCE-type wiring. Make the connection as follows:

1. Obtain suitable cabling for the connection.
You can use a null-modem RS-232 cable or an ordinary RS-232 cable and a null-modem adapter. One end of the cable (or cable/adapter combination) must have a 9-pin D-shell connector suitable for the Diagnostics port; the other end must have a connector suitable for the console's serial communications port.
2. Power down the devices, attach the cable (or cable/adapter combination) to the correct ports, and restore power.
3. Set the console to use the following communication parameters for your terminal:

. The console port is set for the following configuration:
. Baud rate: 115200
. Data width: 8 bits
. Parity: none
. Stop bits: 1
. Flow Control none

A typical console connection is illustrated below:

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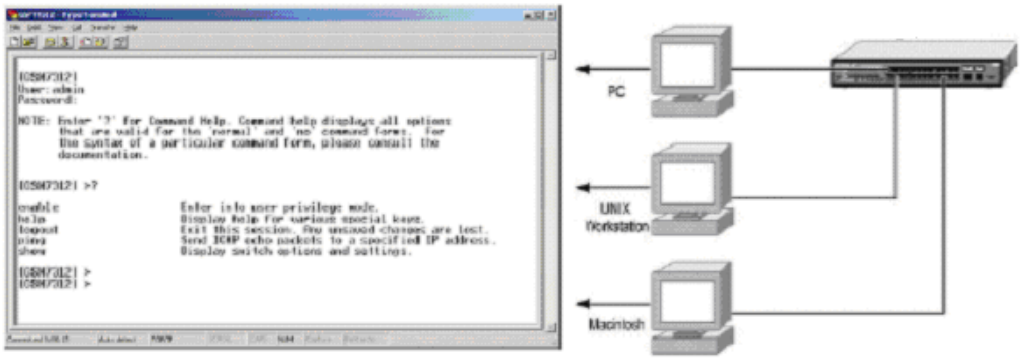

Figure 3-1: Console Setting Environment

2.6 Set Up your Switch Using Telnet Access

Once you have set an IP address for your switch, you can use a Telnet program (in a VT-100 compatible terminal mode) to access and control the switch. Most of the screens are identical, whether accessed from the console port or from a Telnet interface.

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3 Web-Based Management Interface

3.1 Overview

The Fortinet FortiSwitch-100 Managed Switch provides a built-in browser interface that lets you configure and manage it remotely using a standard Web browser such as Microsoft Internet Explorer 5.0 or later or Netscape Navigator 6.0 or later. This interface also allows for system monitoring and management of the switch. The 'help' page covers many of the basic functions and features of the switch and its Web interface. When you configure the switch for the first time from the console, you can assign an IP address and subnet mask to the switch. Thereafter, you can access the switch's Web interface directly using your Web browser by entering the switch's IP address into the address bar. In this way, you can use your Web browser to manage the switch from a central location, just as if you were directly connected to the switch's console port. Figure 4-1 shows this management method.

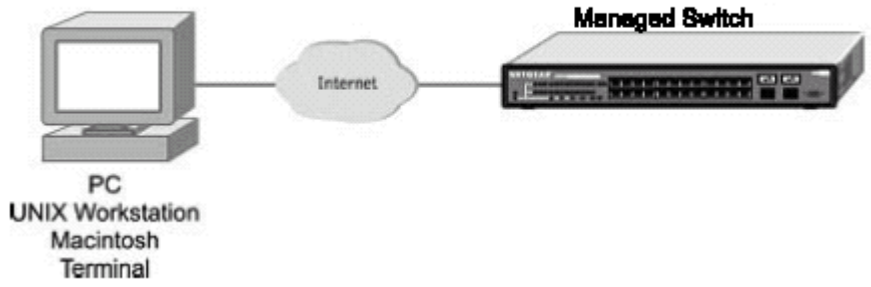

Figure 4-1: Web Management Method

3.2 How to log in

The Fortinet FortiSwitch-100 Managed Switch can be configured remotely from Microsoft Internet Explorer (version 5.0 or above), or Netscape Navigator (version 4.78 or above).

1. Determine the IP address of your managed switch.
2. Open your Web browser.
3. Log in to the managed switch using whatever IP address the unit is currently configured with.
Use the default user name of **admin** and default of no password, or whatever LAN address and password you have set up.

A login window opens:

Click the Login link.
A user name and password dialog box opens.

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4. Type the default user name of **admin** and default of no password, or whatever password you have set up.

Once you have entered your access point name, your Web browser automatically finds the FortiSwitch-100 Managed Switch and display the home page, as shown below.

3.3 Web-Based Management Menu

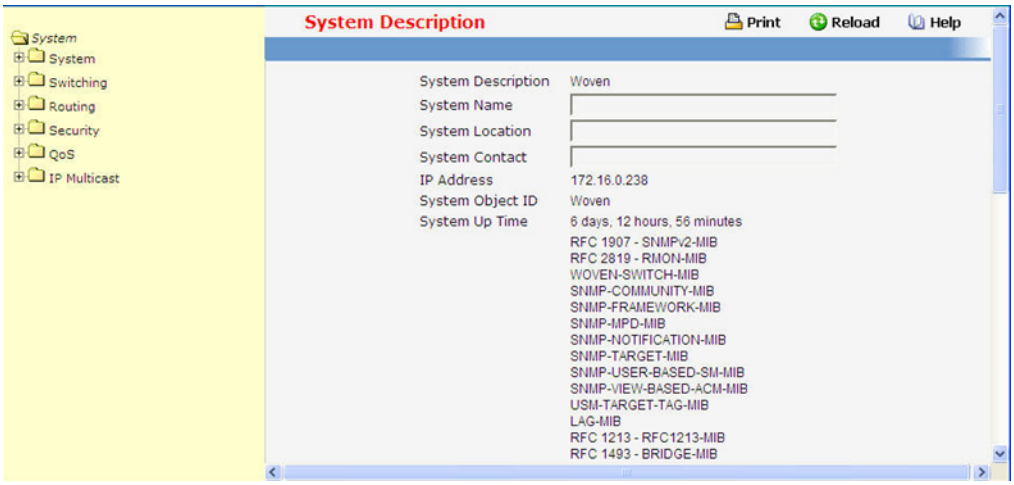

Figure 4-3: System Information page

This above page displays system information, such as:
• System Description
• System Name
• System Location
• System Contact
• IP Address
• System Object ID (OID)
• System Up Time

Menus

The Web-based interface enables navigation through several menus. The main navigation menu is on the left of every page and contains the screens that let you access all the commands and statistics the switch provides.

Main Menus

• System
• Switching

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• Routing
• Security
• QoS
• IP Multicast

Figure 4-4: Main Menus

Secondary Menus

The Secondary Menus under the Main Menu contain a host of options that you can use to configure your switch. The online help contains a detailed description of the features on each screen. You can click the 'help' or the question mark at the top right of each screen to view the help menu topics.

The Secondary Menus are detailed below, with cross-references to the sections in this manual that contain the corresponding command descriptions.

System

• ARP Cache — see "show arp"
• Inventory — see "show hardware"
• Configuration — see "Management Commands and Device Configuration Commands"
• Forwarding Database — see "Device Configuration Commands' L2MAC Address"
• Logs — see "System Information and Statistics Commands"
• Port — see "Device Configuration Commands' Interface"
• SNMP — see "SNMP Server Commands and SNMP Trap Commands"
• Statistics — see "show interface counters"
• System Utilities — see "System Utilities"
• Trap Manager — see "show traplog and SNMP Trap Commands"
• SNTP — see "SNTP Commands"
• DHCP Client — see "DHCP Client Commands"

Switching

• VLAN — see "VLAN Management Commands"
• Protocol-based VLAN — see "VLAN Management Commands"
• GARP — see "GVRP and Bridge Extension Commands"
• IGMP Snooping — see "IGMP Snooping Commands"
• Port Channel — see "Port Channel Commands"
• Multicast Forwarding DataBase — see "L2 MAC Address and Multicast Forwarding Database Tables Commands"

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• Spanning Tree — see “Spanning Tree Commands”
• Class of Service — see “L2 Priority Commands”
• Port Security — see “Port Security Configuration Commands”

Routing
• ARP — see “Address Resolution Protocol (ARP) Commands”
• IP — see “IP Routing Commands”
• OSPF — see “Open Shortest Path First (OSPF) Commands”
• BOOTP/DHCP Relay Agent — see “BOOTP/DHCP Relay Commands”
• DNS Relay — see “Domain Name Server Relay Commands”
• RIP — see “Routing Information Protocol (RIP) Commands”
• Router Discovery — see “Router Discovery Protocol Commands”
• Router — see “IP Routing Commands”
• VLAN Routing — see “VLAN Routing Commands”
• VRRP — see “Virtual Router Redundancy Protocol (VRRP) Commands”

Security
• Port Access Control — see “Dot1x Configuration Commands”
• RADIUS — see “Radius Configuration Commands”
• TACACS — see “TACACS Configuration Commands”
• IP Filter — see “Network Commands”
• Secure HTTP — see “HTTP Commands”
• Secure Shell — see “Secure Shell (SSH) Commands”

QoS
• ACL — see “ACL Commands”
• Diffserv — see “Differentiated Services Commands”
• Class of Service see "Class of Service Commands"

IP Multicast
• DVMRP — see “DVMRP Commands”
• IGMP — see “IGMP Commands”
• Multicast — see “Multicast Commands”
• MDebug — see “Multicast Commands”
• PIM-DM — see “PIM-DM Commands”
• PIM-SM — see “PIM-SM Commands”

System-Wide Popup Menus
The FortiSwitch-100 Managed Switch also provides several popup menus.

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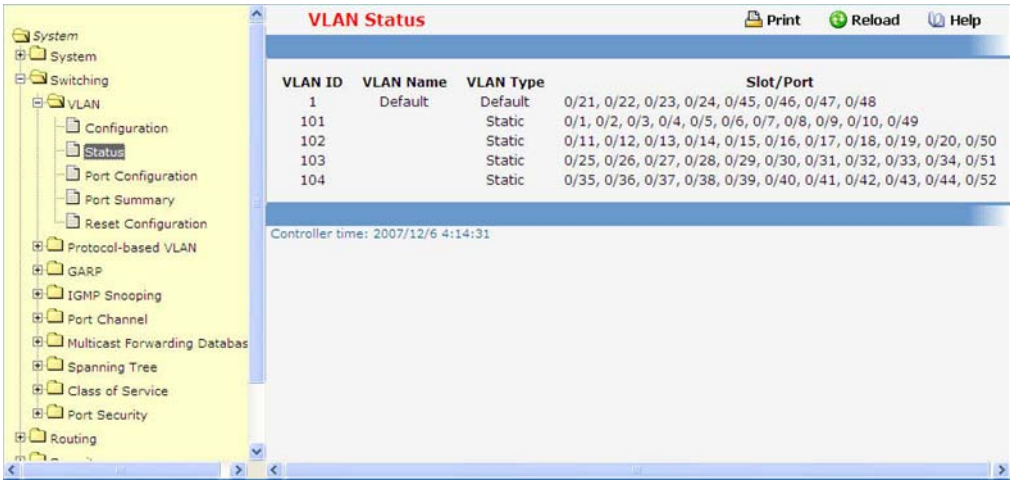
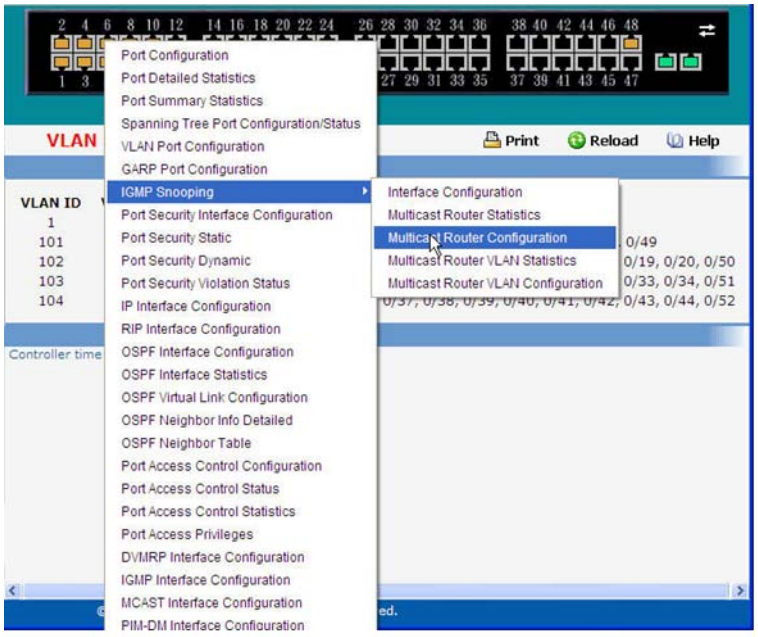


Figure 4-5: System-wide menus

You can also access the main navigation menu by right clicking on the image of the switch and browsing to the menu you want to use.



Port-Specific Popup Menus

The FortiSwitch-100 Managed Switch also provides several popup menus for each port.

You can access a port-specific popup menu by right clicking on the desired port in the image of the switch and browsing to the menu you want to use.

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4 Command Line Interface Structure and Mode-based CLI

The Command Line Interface (CLI) syntax, conventions, and terminology are described in this section. Each CLI command is illustrated using the structure outlined below.

4.1 CLI Command Format

Commands are followed by values, parameters, or both.

Example 1
IP address <ipaddr> <netmask> [<gateway>]
• **Ip address** is the command name.
• **<ipaddr> <netmask>** are the required values for the command.
• **[<gateway>]** is the optional value for the command.

Example 2
snmp-server host <loc>
• **snmp-server location** is the command name.
• **<loc>** is the required parameter for the command.

Example 3

clear vlan
• **clear vlan** is the command name.

Command

The text in bold, non-italic font must be typed exactly as shown.

4.2 CLI Mode-based Topology

Parameters

Parameters are order dependent.
The text in bold italics should be replaced with a name or number. To use spaces as part of a name parameter, enclose it in double quotes like this: "System Name with Spaces".

Parameters may be mandatory values, optional values, choices, or a combination.
– <parameter>. The <> angle brackets indicate that a mandatory parameter must be entered in place of the brackets and text inside them.

– [parameter]. The [] square brackets indicate that an optional parameter may be entered in place of the brackets and text inside them.

– choice1 | choice2. The | indicates that only one of the parameters should be entered.

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The {} curly braces indicate that a parameter must be chosen from the list of choices.

Values

ipaddr This parameter is a valid IP address, made up of four decimal bytes ranging from 0 to 255. The default for all IP parameters consists of zeros (that is, 0.0.0.0). The interface IP address of 0.0.0.0 is invalid.

macaddr The MAC address format is six hexadecimal numbers separated by colons, for example 00:06:29:32:81:40.

areaid Area IDs may be entered in dotted-decimal notation (for example, 0.0.0.1). An area ID of 0.0.0.0 is reserved for the backbone. Area IDs have the same form as IP addresses, but are distinct from IP addresses. The IP network number of the sub-netted network may be used for the area ID.

routerid The value of <router id> must be entered in 4-digit dotted-decimal notation (for example, 0.0.0.1). A router ID of 0.0.0.0 is invalid.

slot/port This parameter denotes a valid slot number and a valid port number. For example, 0/1 represents slot number 0 and port number 1. The <slot/port> field is composed of a valid slot number and a valid port number separated by a forward slash (/).

logical slot/port This parameter denotes a logical slot number and logical port number assigned. This is applicable in the case of a port-channel (LAG). The operator can use the logical slot number and the logical port number to configure the port-channel.

Conventions

Network addresses are used to define a link to a remote host, workstation, or network. Network addresses are shown using the following syntax:

Table 5-1. Network Address Syntax

Address Type	Format	Range
IPAddr	A.B.C.D	0.0.0.0 to 255.255.255.255
MacAddr	YY:YY:YY:YY:YY:YY	hexidecimal digit pairs

Double quotation marks such as "System Name with Spaces" set off user defined strings. If the operator wishes to use spaces as part of a name parameter then it must be enclosed in double quotation marks.

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Empty strings (“”) are not valid user defined strings. Command completion finishes spelling the command when enough letters of a command are typed to uniquely identify the command word. The command may be executed by typing <enter> (command abbreviation) or the command word may be completed by typing the <tab> or <space bar> (command completion).

The value 'Err' designates that the requested value was not internally accessible. This should never happen and indicates that there is a case in the software that is not handled correctly.

The value of '-----' designates that the value is unknown.

Annotations

The CLI allows the user to type single-line annotations at the command prompt for use when writing test or configuration scripts and for better readability. The exclamation point (‘!’) character flags the beginning of a comment. The comment flag character can begin a word anywhere on the command line and all input following this character is ignored. Any command line that begins with the character ‘!’ is recognized as a comment line and ignored by the parser.

Some examples are provided below:

! Script file for displaying the ip interface
! Display information about interfaces
show ip interface 1/0/1 !Displays the information about the first interface
! Display information about the next interface
show ip interface 1/0/2
! End of the script file

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5 Switching Commands

5.1 System Information and Statistics commands

5.1.1 **show arp**

This command displays connectivity between the switch and other devices. The Address Resolution Protocol (ARP) cache identifies the MAC addresses of the IP stations communicating with the switch.

Syntax
show arp

Default Setting

None

Command Mode

Privileged Exec

Display Message

MAC Address: A unicast MAC address for which the switch has forwarding and/or filtering information. The format is 6 two-digit hexadecimal numbers that are separated by colons. For example: 00:23:45:67:89:AB
IP Address: The IP address assigned to each interface.
Interface: A valid slot number and a valid port number.

5.1.2 **show calendar**

This command displays the system clock.

Syntax

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show calendar

Default Setting

None

Command Mode

Privileged Exec

Display Message

Current Time displays system time

5.1.3 **show eventlog**

This command displays the event log, which contains error messages from the system. The event log is not cleared on a system reset.

Syntax
show eventlog [unit]

unit - The unit number of the remote system. The range is 1 to 1.

Default Setting

None

Command Mode

Privileged Exec

Display Message

File: The file in which the event originated.
Line: The line number of the event.
Task Id: The task ID of the event.
Code: The event code.
Time: The time this event occurred.

Note: Event log information is retained across a switch reset.

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5.1.4 **show running-config**

This command is used to display/capture the current setting of different protocol packages supported on switch. This command displays/captures only commands with settings/configurations with values that differ from the default value. The output is displayed in script format, which can be used to configure another switch with the same configuration. When a script name is provided, the output is redirected to a configuration script. The option [all] will also enable the display/capture of all commands with settings/configurations that include values that are same as the default values. If the optional <scriptname> is provided with a file name extension of ".scr", the output will be redirected to a script file.

Syntax
show running-config [all] [<scriptname>]

[all] - enable the display/capture of all commands with settings/configurations that include values that are same as the default values.

<scriptname> - redirect the output to the file <scriptname>.

Default Setting

None

Command Mode

Privileged Exec

5.1.5 **show sysinfo**

This command displays switch brief information and MIBs supported.

Syntax
show sysinfo

Default Setting

None

Command Mode

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Privileged Exec

Display Message

System Description: The text used to identify this switch.
System Name: The name used to identify the switch.
System Location: The text used to identify the location of the switch. May be up to 31 alpha-numeric characters. The factory default is blank.
System Contact: The text used to identify a contact person for this switch. May be up to 31 alphanumeric characters. The factory default is blank.
System Object ID: The manufacturing ID.
System Up Time: The time in days, hours and minutes since the last switch reboot.
MIBs Supported: A list of MIBs supported by this agent.

5.1.6 **show hardware**

This command displays inventory information for the switch.

Syntax
show hardware

Default Setting

None

Command Mode

Privileged Exec

Display Message

System Description: Text used to identify the product name of this switch.
Machine Type: Specifies the machine type as defined by the Vital Product Data.
Machine Model: Specifies the machine model as defined by the Vital Product Data.
Serial Number: The unique box serial number for this switch.
Label Revision Number: The label revision serial number of this switch is used for manufacturing purposes.
Part Number: Manufacturing part number.
Hardware Version: The hardware version of this switch. It is divided into four parts. The first byte is the major version and the second byte represents the minor version.
Loader Version: The release version maintenance number of the loader code currently running on the switch. For example, if the release was 1, the version was 2, and the maintenance number was 4, the format would be '1.2.4'.
Boot Rom Version: The release version maintenance number of the boot ROM code currently running on the switch. For example, if the release was 1, the version was 2, and the maintenance number was 4, the format would be '1.2.4'.
Operating Code Version: The release version maintenance number of the code currently running on the switch. For example, if the release was 1, the version was 2, and the maintenance number was 4, the format would be '1.2.4'.

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5.1.7 **show loginsession**

This command displays current telnet and serial port connections to the switch.

Syntax
show loginsession

Default Setting

None

Command Mode

Privileged Exec

Display Message

ID: Login Session ID
User Name: The name the user will use to login using the serial port or Telnet. A new user may be added to the switch by entering a name in a blank entry. The user name may be up to 8 characters, and is not case sensitive. Two users are included as the factory default, admin, and guest.
Connection From: IP address of the telnet client machine or EIA-232 for the serial port connection.
Idle Time: Time this session has been idle.
Session Time: Total time this session has been connected.
Session Type: Shows the type of session: telnet, serial or SSH.

5.2 Device Configuration Commands

5.2.1 **Interface**

5.2.1.1 **show interface status**

This command displays the Port monitoring information for the system.

Syntax
show interface status {<slot/port> | all}

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<slot/port> - is the desired interface number.

all - This parameter displays information for all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: The physical slot and physical port.
Type: If not blank, this field indicates that this port is a special type of port. The possible values are:
Source - This port is a monitoring port.
PC Mbr - This port is a member of a port-channel (LAG).
Dest - This port is a probe port.
Admin Mode: Selects the Port control administration state. The port must be enabled in order for it to be allowed into the network. – It may be enabled or disabled. The factory default is enabled.
Physical Mode: Selects the desired port speed and duplex mode. If auto-negotiation support is selected, then the duplex mode and speed will be set from the auto-negotiation process. Note that the port's maximum capability (full duplex -100M) will be advertised. Otherwise, this object will determine the port's duplex mode and transmission rate. The factory default is Auto.
Physical Status: Indicates the port speed and duplex mode.
Link Status: Indicates whether the Link is up or down.
Link Trap: This object determines whether to send a trap when link status changes. The factory default is enabled.
LACP Mode: Displays whether LACP is enabled or disabled on this port.
Flow Mode: Displays flow control mode.
Capabilities Status: Displays interface capabilities.

5.2.1.2 **show interface counters**

This command displays a summary of statistics for a specific interface or all interfaces.

Syntax
show interface counters {<slot/port> | all}

<slot/port> - is the desired interface number.

all - This command displays statistics information for all interfaces.

Default Setting

None

Command Mode

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Privileged Exec

Display Message

The display parameters when the argument is '<slot/port>' are as follows:

Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received by the processor.
Packets Received With Error: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.
Packets Transmitted Without Error: The total number of packets transmitted out of the interface.
Transmit Packets Errors: The number of outbound packets that could not be transmitted because of errors.
Collisions Frames: The best estimate of the total number of collisions on this Ethernet segment.
Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

The display parameters when the argument is 'all' are as follows:

Interface: The physical slot and physical port or the logical slot and logical port.
Summary: The summation of the statistics of all ports.
Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received.
Packets Received With Error: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.
Packets Transmitted Without Error: The total number of packets transmitted.
Transmit Packets Errors: The number of outbound packets that could not be transmitted because of errors.
Collisions Frames: The best estimate of the total number of collisions on this Ethernet segment.

This command displays detailed statistics for a specific port or for all CPU traffic based upon the argument.

Syntax
show interface counters detailed {<slot/port> | switchport}

<slot/port> - is the desired interface number.

switchport - This parameter specifies whole switch or all interfaces.

Default Setting

None

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Command Mode

Privileged Exec

Display Message

The display parameters when the argument is ' <slot/port>' are as follows:

Total Packets Received (Octets): The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of Ethernet utilization. If greater precision is desired, the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval. The result of this equation is the value Utilization which is the percent utilization of the Ethernet segment on a scale of 0 to 100 percent.
Packets Received 64 Octets: The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
Packets Received 65-127 Octets: The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
Packets Received 128-255 Octets: The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
Packets Received 256-511 Octets: The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
Packets Received 512-1023 Octets: The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
Packets Received 1024-1518 Octets: The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
Packets Received > 1522 Octets: The total number of packets received that were longer than 1522 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.
Packets RX and TX 64 Octets: The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
Packets RX and TX 65-127 Octets: The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 128-255 Octets: The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 256-511 Octets: The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 512-1023 Octets: The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 1024-1518 Octets: The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 1519-1522 Octets: The total number of packets (including bad packets) received that were between 1519 and 1522 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 1523-2047 Octets: The total number of packets (including bad packets) received that were between 1523 and 2047 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 2048-4095 Octets: The total number of packets (including bad packets) received that were between 2048 and 4095 octets in length inclusive (excluding framing bits but including FCS octets).
Packets RX and TX 4096-9216 Octets: The total number of packets (including bad packets) received that were between 4096 and 9216 octets in length inclusive (excluding framing bits but including FCS octets).

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Total Packets Received Without Errors

Unicast Packets Received: The number of subnetwork-unicast packets delivered to a higher-layer protocol.

Multicast Packets Received: The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.

Broadcast Packets Received: The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Total Packets Received with MAC Errors

Jabbers Received: The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Note that this definition of jabber is different than the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition where any packet exceeds 20 ms. The allowed range to detect jabber is between 20 ms and 150 ms.

Undersize Received: The total number of packets received that were less than 64 octets in length with GOOD CRC(excluding framing bits but including FCS octets).

Fragments Received: The total number of packets received that were less than 64 octets in length with ERROR CRC(excluding framing bits but including FCS octets).

Alignment Errors: The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with a non-integral number of octets.

FCS Errors: The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with an integral number of octets

Overruns: The total number of frames discarded as this port was overloaded with incoming packets, and could not keep up with the inflow.

Total Packets Transmitted (Octets)

Packets Transmitted 64 Octets: The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

Packets Transmitted 65-127 Octets: The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 128-255 Octets: The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 256-511 Octets: The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 512-1023 Octets: The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 1024-1518 Octets: The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 1519-1522 Octets: The total number of packets (including bad packets) received that were between 1519 and 1522 octets in length inclusive (excluding framing bits but including FCS octets).

Max Info: The maximum size of the Info (non-MAC) field that this port will receive or transmit.

Total Packets Transmitted Successfully

Unicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

Multicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.

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Broadcast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.

Total Transmit Errors

FCS Errors: The total number of packets transmitted that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad FCS with an integral number of octets

Tx Oversized: The total number of frames that exceeded the max permitted frame size. This counter has a max increment rate of 815 counts per sec. at 10 Mb/s.

Underrun Errors: The total number of frames discarded because the transmit FIFO buffer became empty during frame transmission.

Total Transmited Packets Discards

Single Collision Frames: A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision.

Multiple Collision Frames: A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.

Excessive Collisions: A count of frames for which transmission on a particular interface fails due to excessive collisions.

GVRP PDUs Received: The count of GVRP PDUs received in the GARP layer.
GVRP PDUs Transmitted: The count of GVRP PDUs transmitted from the GARP layer.
GVRP Failed and Registrations: The number of times attempted GVRP registrations could not be completed.
GMRP PDUs received: The count of GMRP PDUs received in the GARP layer.
GMRP PDUs Transmitted: The count of GMRP PDUs transmitted from the GARP layer.
GMRP Failed Registrations: The number of times attempted GMRP registrations could not be completed.
STP BPDUs Transmitted: Spanning Tree Protocol Bridge Protocol Data Units sent.
STP BPDUs Received: Spanning Tree Protocol Bridge Protocol Data Units received.
RSTP BPDUs Transmitted: Rapid Spanning Tree Protocol Bridge Protocol Data Units sent.
RSTP BPDUs Received: Rapid Spanning Tree Protocol Bridge Protocol Data Units received.
MSTP BPDUs Transmitted: Multiple Spanning Tree Protocol Bridge Protocol Data Units sent.
MSTP BPDUs Received: Multiple Spanning Tree Protocol Bridge Protocol Data Units received.
EAPOL Frames Received: The number of valid EAPOL frames of any type that have been received by this authenticator.
EAPOL Frames Transmitted: The number of EAPOL frames of any type that have been transmitted by this authenticator.
Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

The display parameters when the argument is ‘switchport’ are as follows:

Total Packets Received (Octets): The total number of octets of data received by the processor (excluding framing bits but including FCS octets).
Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received by the processor.
Unicast Packets Received: The number of subnetwork-unicast packets delivered to a higher-layer protocol.
Multicast Packets Received: The total number of packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

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Receive Packets Discarded: The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Octets Transmitted: The total number of octets transmitted out of the interface, including framing characters.
Packets Transmitted without Errors: The total number of packets transmitted out of the interface.
Unicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.
Multicast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.
Broadcast Packets Transmitted: The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.
Transmit Packets Discarded: The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Most Address Entries Ever Used: The highest number of Forwarding Database Address Table entries that have been learned by this switch since the most recent reboot.
Address Entries Currently in Use: The number of Learned and static entries in the Forwarding Database Address Table for this switch.

Maximum VLAN Entries: The maximum number of Virtual LANs (VLANs) allowed on this switch.
Most VLAN Entries Ever Used: The largest number of VLANs that have been active on this switch since the last reboot.
Static VLAN Entries: The number of presently active VLAN entries on this switch that have been created statically.
Dynamic VLAN Entries: The number of presently active VLAN entries on this switch that have been created by GVRP registration.
VLAN Deletes: The number of VLANs on this switch that have been created and then deleted since the last reboot.
Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds, since the statistics for this switch were last cleared.

5.2.1.3 **show interface switch**

This command displays a summary of statistics for all CPU traffic.

Syntax
show interface switch

Default Setting

None

Command Mode

Privileged Exec

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Display Message

Packets Received Without Error: The total number of packets (including broadcast packets and multicast packets) received by the processor.
Broadcast Packets Received: The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.
Packets Received With Error: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
Packets Transmitted Without Error: The total number of packets transmitted out of the interface.
Broadcast Packets Transmitted: The total number of packets that higher-level protocols requested to be transmitted to the Broadcast address, including those that were discarded or not sent.
Transmit Packet Errors: The number of outbound packets that could not be transmitted because of errors.
Address Entries Currently In Use: The total number of Forwarding Database Address Table entries now active on the switch, including learned and static entries.
VLAN Entries Currently In Use: The number of VLAN entries presently occupying the VLAN table.
Time Since Counters Last Cleared: The elapsed time, in days, hours, minutes, and seconds since the statistics for this switch were last cleared.

5.2.1.4 **interface**

This command is used to enter Interface configuration mode. To configure a VLAN interface, use the **interface vlan** command (see page 128).

Syntax
interface <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Global Config

5.2.1.5 **speed-duplex**

This command is used to set the speed and duplex mode for the interface.

Syntax

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speed-duplex {10 | 100} {full-duplex | half-duplex}

100 - 100BASE-T
10 - 10BASE-T
full-duplex - Full duplex
half-duplex - Half duplex

Default Setting

None

Command Mode

Interface Config

This command is used to set the speed and duplex mode for all interfaces.

Syntax

speed-duplex all {10 | 100} {full-duplex | half-duplex}

100 - 100BASE-T
10 - 10BASE-T
full - duplex - Full duplex
half - duplex - Half duplex
all - This command represents all interfaces.

Default Setting

None

Command Mode

Global Config

5.2.1.6 **negotiate**

This command enables automatic negotiation on a port. The default value is enabled.

Syntax

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negotiate

no negotiate

no - This command disables automatic negotiation on a port.

Default Setting

Enable

Command Mode

Interface Config

This command enables automatic negotiation on all interfaces. The default value is enabled.

Syntax

negotiate all

no negotiate all

all - This command represents all interfaces.
no - This command disables automatic negotiation on all interfaces.

Default Setting

Enable

Command Mode

Global Config

5.2.1.7 **capabilities**

This command is used to set the capabilities on specific interface.

Syntax

capabilities {{10 | 100 } {full-duplex | half-duplex}} | {1000 full-duplex }

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no capabilities {{10 | 100 } {full-duplex | half-duplex}} | {1000 full-duplex }

10 - 10BASE-T
100 - 100BASE-T
1000 - 1000BASE-T
full-duplex - Full duplex
half-duplex - Half duplex
no - This command removes the advertised capability with using parameter.

Default Setting

10 half-duplex, 10 full-duplex, 100 half-duplex, 100 full-duplex, and 1000 full-duplex

Command Mode

Interface Config

This command is used to set the capabilities on all interfaces.

Syntax
capabilities all {{10 | 100} {full-duplex | half-duplex}} | {1000 full-duplex }
no capabilities all {{10 | 100} {full-duplex | half-duplex}} | {1000 full-duplex }

10 - 10BASE-T
100 - 100BASE-T
1000 - 1000BASE-T
full-duplex - Full duplex
half-duplex - Half duplex
all - This command represents all interfaces.
no - This command removes the advertised capability with using parameter

Default Setting

10 half-duplex, 10 full-duplex, 100 half-duplex, 100 full-duplex, and 1000 full-duplex

Command Mode

Global Config

5.2.1.8 **storm-control flowcontrol**

This command enables 802.3x flow control for the switch.

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Note: This command only applies to full-duplex mode ports.

Syntax
storm-control flowcontrol **no storm-control flowcontrol**

no - This command disables 802.3x flow control for the switch.

Default Setting

Disabled

Command Mode

Global Config

This command enables 802.3x flow control for the specific interface.

Note: This command only applies to full-duplex mode ports.

Syntax
storm-control flowcontrol **no storm-control flowcontrol**

no - This command disables 802.3x flow control for the specific interface.

Default Setting

Disabled

Command Mode

Interface Config

5.2.1.9 **shutdown**

This command is used to disable a port.

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Syntax
shutdown **no shutdown**

no - This command enables a port.

Default Setting

Enabled

Command Mode

Interface Config

This command is used to disable all ports.

Syntax
shutdown all **no shutdown all**

all - This command represents all ports.
no - This command enables all ports.

Default Setting

Enabled

Command Mode

Global Config

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5.2.2 **L2 MAC Address and Multicast Forwarding Database Tables**

5.2.2.1 **show mac-addr-table**

This command displays the forwarding database entries. If the command is entered with no parameter, the entire table is displayed. This is the same as entering the optional **all** parameter. Alternatively, the administrator can enter a MAC Address to display the table entry for the requested MAC address and all entries following the requested MAC address.

Syntax
show mac-addr-table [{<macaddr> |all}]

<macaddr> - enter a MAC Address to display the table entry for the requested MAC address.

all – this command displays the entire table.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the switch has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**
Interface: The port on which this L2 MAC address was learned.
if Index: This object indicates the if Index of the interface table entry associated with this port.
Status: The status of this entry.

The meanings of the values are:

Static: The value of the corresponding instance was added by the system or a user when a static MAC filter was defined. It cannot be relearned.
Learned: The value of the corresponding instance was learned by observing the source MAC addresses of incoming traffic, and is currently in use.
Management: The value of the corresponding instance (system MAC address) is also the value of an existing instance of dot1dStaticAddress. It is identified with interface 3/1 and is currently used when enabling VLANs for routing.
Self: The value of the corresponding instance is the address of one of the switch's physical interfaces (the system's own MAC address).
GMRP Learned: The value of the corresponding instance was learned via GMRP and applies to Multicast.
Other: The value of the corresponding instance does not fall into one of the other categories.

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5.2.2.2 **show mac-address-table gmrp**

This command displays the GARP Multicast Registration Protocol (GMRP) entries in the Multicast Forwarding Database (MFDB) table.

Syntax
show mac-address-table gmrp

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the switch has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**
Type: This displays the type of the entry. Static entries are those that are configured by the end user. Dynamic entries are added to the table as a result of a learning process or protocol.
Description: The text description of this multicast table entry.
Interfaces: The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:).

5.2.2.3 **show mac-address-table igmpsnooping**

This command displays the IGMP Snooping entries in the Multicast Forwarding Database (MFDB) table.

Syntax
show mac-address-table igmpsnooping

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the switch has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example

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01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**
Type: This displays the type of the entry. Static entries are those that are configured by the end user. Dynamic entries are added to the table as a result of a learning process or protocol.
Description: The text description of this multicast table entry.
Interfaces: The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:).

5.2.2.4 **show mac-address-table multicast**

This command displays the MFDB information. If the command is entered with no parameter, the entire table is displayed. This is the same as entering the *all* parameter. The user can display the table entry for one MAC Address by specifying the MAC address as an optional parameter.

Syntax
show mac-address-table multicast {<macaddr> <vlanid> | all }

<macaddr> - enter a MAC Address to display the table entry for the requested MAC address

<vlanid> - VLAN ID (Range: 1 – 3965)

all – This command displays the entire table.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Mac Address: A unicast MAC address for which the switch has forwarding and/or filtering information. The format is 6 or 8 two-digit hexadecimal numbers that are separated by colons, for example 01:23:45:67:89:AB. In an IVL system the MAC address will be displayed as 8 bytes. In an SVL system, the MAC address will be displayed as 6 bytes. **Note: This software version only supports IVL systems.**
Type: This displays the type of the entry. Static entries are those that are configured by the end user. Dynamic entries are added to the table as a result of a learning process or protocol.
Source: The component that is responsible for this entry in the Multicast Forwarding Database. Possible values are IGMP Snooping, GMRP, and Static Filtering.
Description: The text description of this multicast table entry.
Interfaces: The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:).
Forwarding Interfaces: The resultant forwarding list is derived from combining all the component's forwarding interfaces and removing the interfaces that are listed as the static filtering interfaces.

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5.2.2.5 **show mac-address-table stats**

This command displays the MFDB statistics.

Syntax
show mac-address-table stats

Default Setting

None

Command Mode

Privileged Exec

Display Message

Max MFDB Table Entries: This displays the total number of entries that can possibly be in the MFDB.
Most MFDB Entries Since Last Reset: This displays the largest number of entries that have been present in the Multicast Forwarding Database table. This value is also known as the MFDB high-water mark.
Current Entries: This displays the current number of entries in the Multicast Forwarding Database table.

5.2.2.6 **show mac-address-table agetime**

This command displays the forwarding database address aging timeout.

Syntax
show mac-address-table agetime

Default Setting

None

Command Mode

Privileged Exec

Display Message

Address Aging Timout: This displays the total number of seconds for Forwarding Database table.

5.2.2.7 **mac-address-table aging-time**

This command configures the forwarding database address aging timeout in seconds.

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Syntax
mac-address-table aging-time <10-1000000> **no mac-address-table aging-time <10-1000000>**

<10-1000000> - aging-time (Range: 10-1000000) in seconds
no - This command sets the forwarding database address aging timeout to 300 seconds.

Default Setting

300

Command Mode

Global Config

5.2.3 VLAN Management

5.2.3.1 show vlan

This command displays brief information on a list of all configured VLANs.

Syntax
show vlan

Default Setting

None

Command Mode

Privileged Exec

Display Message

VLAN ID: There is a VLAN Identifier (vlanid) associated with each VLAN. The range of the VLAN ID is 1 to 3965.

VLAN Name: A string associated with this VLAN as a convenience. It can be up to 16 alphanumeric characters, including blanks. The default is blank. VLAN ID 1 is always named `Default`. This field is optional.

VLAN Type: Type of VLAN, which can be Default, (VLAN ID = 1), can be static (one that is configured and permanently defined), or Dynamic (one that is created by GVRP registration).

Interface(s): Indicates by slot id and port number which port belongs to this VLAN.

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5.2.3.2 **show vlan id**

This command displays detailed information, including interface information, for a specific VLAN.

Syntax
show vlan {id <vlanid> | name <vlanname>}

<vlanid> - VLAN ID (Range: 1 – 3965)
<vlanname> - vlan name (up to 16 alphanumeric characters)

Default Setting

None

Command Mode

Privileged Exec

Display Message

VLAN ID: There is a VLAN Identifier (VID) associated with each VLAN. The range of the VLAN ID is 1 to 3965.
VLAN Name: A string associated with this VLAN as a convenience. It can be up to 16 alphanumeric characters, including blanks. The default is blank. VLAN ID 1 is always named `Default`. This field is optional.
VLAN Type: Type of VLAN, which can be Default, (VLAN ID = 1), can be static (one that is configured and permanently defined), or Dynamic (one that is created by GVRP registration).
Slot/port: Indicates by slot id and port number which port is controlled by the fields on this line.
It is possible to set the parameters for all ports by using the selectors on the top line.
Current: Determines the degree of participation of this port in this VLAN. The permissible values are:
Include: This port is always a member of this VLAN. This is equivalent to registration fixed in the IEEE 802.1Q standard.
Exclude: This port is never a member of this VLAN. This is equivalent to registration forbidden in the IEEE 802.1Q standard.
Autodetect: Specifies to allow the port to be dynamically registered in this VLAN via GVRP. The port will not participate in this VLAN unless a join request is received on this port. This is equivalent to registration normal in the IEEE 802.1Q standard.
Configured: Determines the configured degree of participation of this port in this VLAN. The permissible values are:
Include: This port is always a member of this VLAN. This is equivalent to registration fixed in the IEEE 802.1Q standard.
Exclude: This port is never a member of this VLAN. This is equivalent to registration forbidden in the IEEE 802.1Q standard.
Autodetect: Specifies to allow the port to be dynamically registered in this VLAN via GVRP. The port will not participate in this VLAN unless a join request is received on this port. This is equivalent to registration normal in the IEEE 802.1Q standard.
Tagging: Select the tagging behavior for this port in this VLAN.
Tagged: Specifies to transmit traffic for this VLAN as tagged frames.
Untagged: Specifies to transmit traffic for this VLAN as untagged frames.

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5.2.3.3 **show protocol group**

This command displays the Protocol-Based VLAN information for either the entire system, or for the indicated Group.

Syntax
show protocol group {<group-name> | all}

<group-name> - The group name of an entry in the Protocol-based VLAN table.
all – Displays the entire table.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Group Name: This field displays the group name of an entry in the Protocol-based VLAN table.
Group ID: This field displays the group identifier of the protocol group.
Protocol(s): This field indicates the type of protocol(s) for this group.
VLAN: This field indicates the VLAN associated with this Protocol Group.
Interface(s): This field lists the slot/port interface(s) that are associated with this Protocol Group.

5.2.3.4 **show interface switchport**

This command displays VLAN port information.

Syntax
show interface switchport {<slot/port> | all}

<slot/port> - Interface number.
all – Display the entire table.

Default Setting

None

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Command Mode

Privileged Exec

Display Message

Slot/port: Indicates by slot id and port number which port is controlled by the fields on this line. It is possible to set the parameters for all ports by using the selectors on the top line.
Port VLAN ID: The VLAN ID that this port will assign to untagged frames or priority tagged frames received on this port. The value must be for an existing VLAN. The factory default is 1.
Acceptable Frame Types: Specifies the types of frames that may be received on this port. The options are 'VLAN only' and 'Admit All'. When set to 'VLAN only', untagged frames or priority tagged frames received on this port are discarded. When set to 'Admit All', untagged frames or priority tagged frames received on this port are accepted and assigned the value of the Port VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance to the 802.1Q VLAN specification.
Ingress Filtering: May be enabled or disabled. When enabled, the frame is discarded if this port is not a member of the VLAN with which this frame is associated. In a tagged frame, the VLAN is identified by the VLAN ID in the tag. In an untagged frame, the VLAN is the Port VLAN ID specified for the port that received this frame. When disabled, all frames are forwarded in accordance with the 802.1Q VLAN bridge specification. The factory default is disabled.
GVRP: May be enabled or disabled.
Default Priority: The 802.1p priority assigned to untagged packets arriving on the port.

5.2.3.5 **vlan database**

This command is used to enter VLAN Interface configuration mode

Syntax
vlan database

Default Setting

None

Command Mode

Global Config

5.2.3.6 **vlan**

This command creates a new VLAN and assigns it an ID. The ID is a valid VLAN identification number (ID 1 is reserved for the default VLAN). VLAN range is 2-3965.

Syntax

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vlan <vlanid> [<name>]

no vlan <vlanid>

<vlanid> - VLAN ID (Range: 2 –3965).
<name> - Configure an optional VLAN Name (a character string of 1 to 32 alphanumeric characters).
no - This command deletes an existing VLAN. The ID is a valid VLAN identification number (ID 1 is reserved for the default VLAN). VLAN range is 2-3965.

Default Setting

None

Command Mode

VLAN database

5.2.3.7 **vlan name**

This command changes the name of a VLAN. The name is an alphanumeric string of up to 32 characters, and the ID is a valid VLAN identification number. ID range is 1- 3965.

Syntax

vlan name <vlanid> <newname>

no vlan name <vlanid>

<vlanid> - VLAN ID (Range: 1 –3965).
<newname> - Configure a new VLAN Name (up to 16 alphanumeric characters).
no - This command sets the name of a VLAN to a blank string. The VLAN ID is a valid VLAN identification number. ID range is 1-3965.

Default Setting

The name for VLAN ID 1 is always Default. The name for other VLANs is defaulted to a blank string.

Command Mode

VLAN database

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5.2.3.8 **vlan makestatic**

This command changes a dynamically created VLAN (one that is created by GVRP registration) to a static VLAN (one that is permanently configured and defined). The ID is a valid VLAN identification number. VLAN range is 2-3965.

Syntax
vlan makestatic <vlanid>

<vlanid> - VLAN ID (Range: 2 –3965).

Default Setting

None

Command Mode

VLAN database

5.2.3.9 **protocol group**

This command attaches a <vlanid> to the protocol-based VLAN identified by <group-name>. A group may only be associated with one VLAN at a time, however the VLAN association can be changed.

Syntax
protocol group <group-name> <vlanid> **no protocol group <group-name> <vlanid>**

<vlanid> - VLAN ID (Range: 1 –3965).
<group-name> - a VLAN Group Name (a character string of 1 to 16 characters).
no - This command removes the <vlanid> from this protocol-based VLAN group that is identified by this <group-name>.

Default Setting

None

Command Mode

VLAN database

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5.2.3.10 **switchport acceptable-frame-type**

This command sets the frame acceptance mode per interface. For VLAN Only mode, untagged frames or priority frames received on this interface are discarded. For Admit All mode, untagged frames or priority frames received on this interface are accepted and assigned the value of the interface VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance with the IEEE 802.1Q VLAN Specification.

Syntax
switchport acceptable-frame-type {tagged | all} **no switchport acceptable-frame-type {tagged | all}**

tagged - VLAN only mode.
all - Admit all mode.
no - This command sets the frame acceptance mode per interface to **Admit All**. For Admit All mode, untagged frames or priority frames received on this interface are accepted and assigned the value of the interface VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance with the IEEE 802.1Q VLAN Specification.

Default Setting

Admit all

Command Mode

Interface Config

This command sets the frame acceptance mode for all interfaces. For VLAN Only mode, untagged frames or priority frames received on this interface are discarded. For Admit All mode, untagged frames or priority frames received on this interface are accepted and assigned the value of the interface VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance with the IEEE 802.1Q VLAN Specification.

Syntax
switchport acceptable-frame-type all {tagged | all} **no switchport acceptable-frame-type all {tagged | all}**

tagged - VLAN only mode.
all – One is for Admit all mode. The other one is for all interfaces.
no - This command sets the frame acceptance mode for all interfaces to **Admit All**. For Admit All mode, untagged frames or priority frames received on this interface are accepted and assigned the value of the

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interface VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance with the IEEE 802.1Q VLAN Specification.

Default Setting

Admit all

Command Mode

Global Config

5.2.3.11 **switchport ingress-filtering**

This command enables ingress filtering. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

Syntax
switchport ingress-filtering
no switchport ingress-filtering

no - This command disables ingress filtering. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

Default Setting

Disabled

Command Mode

Interface Config

This command enables ingress filtering for all ports. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

Syntax
switchport ingress-filtering all

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no switchport ingress-filtering all

all - All interfaces.
no - This command disables ingress filtering for all ports. If ingress filtering is disabled, frames received with VLAN IDs that do not match the VLAN membership of the receiving interface are admitted and forwarded to ports that are members of that VLAN.

Default Setting

Disabled

Command Mode

Global Config

5.2.3.12 **switchport native vlan**

This command changes the VLAN ID per interface.

Syntax

switchport native vlan <vlanid>

no switchport native vlan <vlanid>

<vlanid> - VLAN ID (Range: 1 –3965).
no - This command sets the VLAN ID per interface to 1.

Default Setting

1

Command Mode

Interface Config

This command changes the VLAN ID for all interfaces.

Syntax

switchport native vlan all <vlanid>

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<vlanid> - VLAN ID (Range: 1 –3965).
all - All interfaces.
no - This command sets the VLAN ID for all interfaces to 1.

Default Setting

1

Command Mode

Global Config

5.2.3.13 **switchport allowed vlan**

This command configures the degree of participation for a specific interface in a VLAN. The ID is a valid VLAN identification number, and the interface is a valid interface number**.**

Syntax

switchport allowed vlan {add [tagged | untagged] | remove} <vlanid>

<vlanid> - VLAN ID (Range: 1 –3965).
add - The interface is always a member of this VLAN. This is equivalent to registration fixed.
tagged - All frames transmitted for this VLAN will be tagged.
untagged - All frames transmitted for this VLAN will be untagged.
remove - The interface is removed from the member of this VLAN. This is equivalent to registration forbidden.

Default Setting

None

Command Mode

Interface Config

This command configures the degree of participation for all interfaces in a VLAN. The ID is a valid VLAN identification number**.**

Syntax

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switchport allowed vlan {add {tagged | untagged} | remove} all <vlanid>

<vlanid> - VLAN ID (Range: 1 –3965).
all - All interfaces.
add - The interface is always a member of this VLAN. This is equivalent to registration fixed.
tagged - all frames transmitted for this VLAN will be tagged.
untagged - all frames transmitted for this VLAN will be untagged.
remove - The interface is removed from the member of this VLAN. This is equivalent to registration forbidden.

Default Setting

None

Command Mode

Global Config

5.2.3.14 **switchport tagging**

This command configures the tagging behavior for a specific interface in a VLAN to enable. If tagging is enabled, traffic is transmitted as tagged frames. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

Syntax

switchport tagging <vlanid>

no switchport tagging <vlanid>

<vlanid> - VLAN ID (Range: 1 –3965).
no - This command configures the tagging behavior for a specific interface in a VLAN to disabled. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

Default Setting

Disabled

Command Mode

Interface Config

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This command configures the tagging behavior for all interfaces in a VLAN to be enabled. If tagging is enabled, traffic is transmitted as tagged frames. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

Syntax
switchport tagging all <vlanid>

<vlanid> - VLAN ID (Range: 1 –3965).
all - All interfaces
no - This command configures the tagging behavior for all interfaces in a VLAN to disabled. If tagging is disabled, traffic is transmitted as untagged frames. The ID is a valid VLAN identification number.

Default Setting

Disabled

Command Mode

Global Config

5.2.3.15 **switchport priority**

This command configures the default 802.1p port priority assigned for untagged packets for a specific interface.

Syntax
switchport priority <0-7>

<0-7> - The range for the priority is 0 - 7.

Default Setting

0

Command Mode

Interface Config

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This command configures the port priority assigned for untagged packets for all ports presently plugged into the device. Any subsequent per port configuration will override this configuration setting.

Syntax
switchport priority all <0-7>

<0-7> - The range for the priority is 0-7.

all – All interfaces

Default Setting

0

Command Mode

Global Config

5.2.3.16 **switchport protocol group**

This command adds the physical <*slot/port*> interface to the protocol-based VLAN identified by <*group-name*>. A group may have more than one interface associated with it. Each interface and protocol combination can only be associated with one group. If adding an interface to a group causes any conflicts with protocols currently associated with the group, this command will fail, and the interface(s) will not be added to the group.

Syntax
switchport protocol group <group-name>
no switchport protocol group <group-name>

<group-name> - a VLAN Group Name (a character string of 1 to 16 characters).

no - This command removes the *interface* from this protocol-based VLAN group that is identified by this <*group-name*>.

Default Setting

None

Command Mode

Interface Config

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This command adds a protocol-based VLAN group to the system. The <*group-name*> is a character string of 1 to 16 characters. When it is created, the protocol group will be assigned a unique number that will be used to identify the group in subsequent commands.

Syntax

switchport protocol group <group-name>

no switchport protocol group <group-name>

<group-name> - a VLAN Group Name (a character string of 1 to 16 characters).

no - This command removes the protocol-based VLAN group that is identified by this <group-name>.

Default Setting

None

Command Mode

Global Config

This command adds all physical interfaces to the protocol-based VLAN identified by <*group-name*>. A group may have more than one interface associated with it. Each interface and protocol combination can only be associated with one group. If adding an interface to a group causes any conflicts with protocols currently associated with the group, this command will fail, and the interface(s) will not be added to the group.

Syntax

switchport protocol group all <group-name>

no switchport protocol group all <group-name>

<group-name> - a VLAN Group Name (a character string of 1 to 16 characters).

all - All interfaces.

no - This command removes all interfaces from this protocol-based VLAN group that is identified by this <group-name>.

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Default Setting

None

Command Mode

Global Config

This command adds the <protocol> to the protocol-based VLAN identified by <group-name>. A group may have more than one protocol associated with it. Each interface and protocol combination can only be associated with one group. If adding a protocol to a group causes any conflicts with interfaces currently associated with the group, this command will fail, and the protocol will not be added to the group. The possible values for protocol are *ip, arp,* and *ipx*.

Syntax
switchport protocol group add protocol <group-name> {ip | arp | ipx}
no switchport protocol group add protocol <group-name> {ip | arp | ipx}

<group-name> - a VLAN Group Name (a character string of 1 to 16 characters).

ip - IP protocol.

arp - ARP protocol.

ipx - IPX protocol.

no - This command removes the <*protocol*> from this protocol-based VLAN group that is identified by this <*group-name*>. The possible values for protocol are *ip, arp,* and *ipx*.

Default Setting

None

Command Mode

Global Config

5.2.3.17 **switchport forbidden vlan**

This command used to configure forbidden VLANs.

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Syntax
switchport forbidden vlan {add | remove} <vlanid> **no switchport forbidden**

<vlanid> - VLAN ID (Range: 1 –3965).

add - VLAND ID to add.

remove - VLAND ID to remove.

no - Remove the list of forbidden VLANs.

Default Setting

None

Command Mode

Interface Config

5.2.4 GVRP and Bridge Extension

5.2.4.1 show bridge-ext

This command displays Generic Attributes Registration Protocol (GARP) information.

Syntax
show bridge-ext

Default Setting

None

Command Mode

Privileged Exec

Display Message

GMRP Admin Mode: This displays the administrative mode of GARP Multicast Registration Protocol (GMRP) for the system.
GVRP Admin Mode: This displays the administrative mode of GARP VLAN Registration Protocol (GVRP) for the system.

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5.2.4.2 **show gvrp configuration**

This command displays Generic Attributes Registration Protocol (GARP) information for one or all interfaces.

Syntax
show gvrp configuration {<slot/port> | all}

<slot/port> - An interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: This displays the slot/port of the interface that this row in the table describes.
Join Timer: Specifies the interval between the transmission of GARP PDUs registering (or re-registering) membership for an attribute. Current attributes are a VLAN or multicast group. There is an instance of this timer on a per-Port, per-GARP participant basis. Permissible values are 10 to 100 centiseconds (0.1 to 1.0 seconds). The factory default is 20 centiseconds (0.2 seconds). The finest granularity of specification is 1 centisecond (0.01 seconds).
Leave Timer: Specifies the period of time to wait after receiving an unregister request for an attribute before deleting the attribute. Current attributes are a VLAN or multicast group. This may be considered a buffer time for another station to assert registration for the same attribute in order to maintain uninterrupted service. There is an instance of this timer on a per-Port, per-GARP participant basis. Permissible values are 20 to 600 centiseconds (0.2 to 6.0 seconds). The factory default is 60 centiseconds (0.6 seconds). The finest granularity of specification is 1 centisecond (0.01 seconds).
LeaveAll Timer: This Leave All Time controls how frequently LeaveAll PDUs are generated. A LeaveAll PDU indicates that all registrations will shortly be deregistered. Participants will need to rejoin in order to maintain registration. There is an instance of this timer on a per-Port, per-GARP participant basis. The Leave All Period Timer is set to a random value in the range of LeaveAll- Time to 1.5*LeaveAllTime. Permissible values are 200 to 6000 centiseconds (2 to 60 seconds). The factory default is 1000 centiseconds (10 seconds). The finest granularity of specification is 1 centisecond (0.01 seconds).
Port GVRP Mode: Indicates the GVRP administrative mode for the port. It may be enabled or disabled. If this parameter is disabled, Join Time, Leave Time, and Leave All Time have no effect. The factory default is disabled.

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5.2.4.3 **show gmrp configuration**

This command displays Generic Attributes Registration Protocol (GARP) information for one or All interfaces.

Syntax
show gmrp configuration {<slot/port> | all}

<slot/port> - An interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: This displays the slot/port of the interface that this row in the table describes.
Join Timer: Specifies the interval between the transmission of GARP PDUs registering (or re-registering) membership for an attribute. Current attributes are a VLAN or multicast group. There is an instance of this timer on a per-Port, per-GARP participant basis. Permissible values are 10 to 100 centiseconds (0.1 to 1.0 seconds). The factory default is 20 centiseconds (0.2 seconds). The finest granularity of specification is 1 centisecond (0.01 seconds).
Leave Timer: Specifies the period of time to wait after receiving an unregister request for an attribute before deleting the attribute. Current attributes are a VLAN or multicast group. This may be considered a buffer time for another station to assert registration for the same attribute in order to maintain uninterrupted service. There is an instance of this timer on a per-Port, per-GARP participant basis. Permissible values are 20 to 600 centiseconds (0.2 to 6.0 seconds). The factory default is 60 centiseconds (0.6 seconds). The finest granularity of specification is 1 centisecond (0.01 seconds).
LeaveAll Timer: This Leave All Time controls how frequently LeaveAll PDUs are generated. A LeaveAll PDU indicates that all registrations will shortly be deregistered. Participants will need to rejoin in order to maintain registration. There is an instance of this timer on a per-Port, per-GARP participant basis. The Leave All Period Timer is set to a random value in the range of LeaveAll- Time to 1.5*LeaveAllTime. Permissible values are 200 to 6000 centiseconds (2 to 60 seconds). The factory default is 1000 centiseconds (10 seconds). The finest granularity of specification is 1 centisecond (0.01 seconds).
Port GMRP Mode: Indicates the GMRP administrative mode for the port. It may be enabled or disabled. If this parameter is disabled, Join Time, Leave Time, and Leave All Time have no effect. The factory default is disabled.

5.2.4.4 **show garp configuration**

This command displays GMRP and GVRP configuration information for one or all interfaces.

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Syntax
show garp configuration {<slot/port> | all}

<slot/port> - An interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: This displays the slot/port of the interface that this row in the table describes.

GVRP Mode: Indicates the GVRP administrative mode for the port. It may be enabled or disabled. If this parameter is disabled, Join Time, Leave Time, and Leave All Time have no effect. The factory default is disabled.
GMRP Mode: Indicates the GMRP administrative mode for the port. It may be enabled or disabled. If this parameter is disabled, Join Time, Leave Time, and Leave All Time have no effect. The factory default is disabled.

5.2.4.5 **bridge-ext gvrp**

This command enables GVRP.

Syntax
bridge-ext gvrp
no bridge-ext gvrp

no - This command disables GVRP.

Default Setting

Disabled

Command Mode

Global Config

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5.2.4.6 **bridge-ext gmrp**

This command enables GARP Multicast Registration Protocol (GMRP) on the system. The default value is disabled.

Syntax
bridge-ext gmrp
no bridge-ext gmrp

no - This command disables GARP Multicast Registration Protocol (GMRP) on the system.

Default Setting

Disabled

Command Mode

Global Config

5.2.4.7 **switchport gvrp**

This command enables GVRP (GARP VLAN Registration Protocol) for a specific port.

Syntax
switchport gvrp
no switchport gvrp

no - This command disables GVRP (GARP VLAN Registration Protocol) for a specific port. If GVRP is disabled, Join Time, Leave Time, and Leave All Time have no effect.

Default Setting

Disabled

Command Mode

Interface Config

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This command enables GVRP (GARP VLAN Registration Protocol) for all ports.

Syntax
switchport gvrp all
no switchport gvrp all

all - All interfaces.

no - This command disables GVRP (GARP VLAN Registration Protocol) for all ports. If GVRP is disabled, Join Time, Leave Time, and Leave All Time have no effect.

Default Setting

Disabled

Command Mode

Global Config

5.2.4.8 **switchport gmrp**

This command enables GMRP Multicast Registration Protocol on a selected interface. If an interface which has GMRP enabled is enabled for routing or is enlisted as a member of a port-channel (LAG), GMRP functionality will be disabled on that interface. GMRP functionality will subsequently be re-enabled if routing is disabled or port-channel (LAG) membership is removed from an interface that has GMRP enabled.

Syntax
switchport gmrp
no switchport gmrp

no - This command disables GMRP Multicast Registration Protocol on a selected interface. If an interface which has GMRP enabled is enabled for routing or is enlisted as a member of a port-channel (LAG), GMRP functionality will be disabled on that interface. GMRP functionality will subsequently be re-enabled if routing is disabled or port-channel (LAG) membership is removed from an interface that has GMRP enabled.

Default Setting

Disabled

Command Mode

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Interface Config

This command enables GMRP Multicast Registration Protocol on all interfaces. If an interface which has GMRP enabled is enabled for routing or is enlisted as a member of a port-channel (LAG), GMRP functionality will be disabled on that interface. GMRP functionality will subsequently be re-enabled if routing is disabled and port-channel (LAG) membership is removed from an interface that has GMRP enabled.

Syntax
switchport gmrp all
no switchport gmrp all

all - All interfaces.

no - This command disables GMRP Multicast Registration Protocol on a selected interface.

Default Setting

Disabled

Command Mode

Global Config

5.2.4.9 **garp timer**

This command sets the GVRP join time per port and per GARP. Join time is the interval between the transmission of GARP Protocol Data Units (PDUs) registering (or re-registering) membership for a VLAN or multicast group.

This command has an effect only when GVRP and GMRP are enabled. The time is from 10 to 100 (centiseconds).

Syntax
garp timer join <10-100>
no garp timer join

<10-100> - join time (Range: 10 – 100) in centiseconds.

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no - This command sets the GVRP join time per port and per GARP to 20 centiseconds (0.2 seconds). This command has an effect only when GVRP and GMRP are enabled.

Default Setting

20 centiseconds (0.2 seconds)

Command Mode

Interface Config

This command sets the GVRP join time for all ports and per GARP. Join time is the interval between the transmission of GARP Protocol Data Units (PDUs) registering (or re-registering) membership for a VLAN or multicast group.

This command has an effect only when GVRP and GMRP are enabled. The time is from 10 to 100 (centiseconds).

Syntax
garp timer join all < 10-100 > **no garp timer join all**

<10-100> - join time (Range: 10 – 100) in centiseconds.

all - All interfaces.

no - This command sets the GVRP join time for all ports and per GARP to 20 centiseconds (0.2 seconds). This command has an effect only when GVRP and GMRP are enabled.

Default Setting

20 centiseconds (0.2 seconds)

Command Mode

Global Config

This command sets the GVRP leave time per port. Leave time is the time to wait after receiving an unregister request for a VLAN or a multicast group before deleting the VLAN entry. This can be considered a buffer time for another station to assert registration for the same attribute in order to maintain uninterrupted service. The time is from 20 to 600 (centiseconds).

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Note: This command has an effect only when GVRP and GMRP are enabled.

Syntax
garp timer leave < 20-600 >
no garp timer leave

<20-600> - leave time (Range: 20 – 600) in centiseconds.

no - This command sets the GVRP leave time per port to 60 centiseconds (0.6 seconds).

Note: This command has an effect only when GVRP and GMRP are enabled.

Default Setting

60 centiseconds (0.6 seconds)

Command Mode

Interface Config

This command sets the GVRP leave time for all ports. Leave time is the time to wait after receiving an unregister request for a VLAN or a multicast group before deleting the VLAN entry. This can be considered a buffer time for another station to assert registration for the same attribute in order to maintain uninterrupted service. The time is from 20 to 600 (centiseconds).

Note: This command has an effect only when GVRP and GMRP are enabled.

Syntax
garp timer leave all < 20-600 >
no garp timer leave all

<20-600> - leave time (Range: 20 – 600) in centiseconds.

all - All interfaces.

no - This command sets the GVRP leave time for all ports to the default 60 centiseconds (0.6 seconds).

Note: This command has an effect only when GVRP and GMRP are enabled.

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Default Setting

60 centiseconds (0.6 seconds)

Command Mode

Global Config

This command sets how frequently Leave All PDUs are generated per port. A Leave All PDU indicates that all registrations will be unregistered. Participants would need to rejoin in order to maintain registration. The value applies per port and per GARP participation. The time may range from 200 to 6000 (centiseconds).

Note: This command has an effect only when GVRP and GMRP are enabled.

Syntax
garp timer leaveall < 200-6000 > **no garp timer leaveall**

<200-6000> - leave time (Range: 200 – 6000) in centiseconds.

no - This command sets how frequently Leave All PDUs are generated per port to 1000 centiseconds (10 seconds).

Note: This command has an effect only when GVRP and GMRP are enabled.

Default Setting

1000 centiseconds (10 seconds)

Command Mode

Interface Config

This command sets how frequently Leave All PDUs are generated for all ports. A Leave All PDU indicates that all registrations will be unregistered. Participants would need to rejoin in order to maintain registration. The value applies per port and per GARP participation. The time may range from 200 to 6000 (centiseconds).

Note: This command has an effect only when GVRP and GMRP are enabled.

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Syntax
garp timer leaveall all < 200-6000 >
no garp timer leaveall all

<200-6000> - leave time (Range: 200 – 6000) in centiseconds.

all - All interfaces.

no - This command sets how frequently Leave All PDUs are generated for all ports to 1000 centiseconds (10 seconds).

Note: This command has an effect only when GVRP and GMRP are enabled.

Default Setting

1000 centiseconds (10 seconds)

Command Mode

Global Config

5.2.5 IGMP Snooping

5.2.5.1 Show Commands

show ip igmp snooping

This command displays IGMP Snooping information. Configured information is displayed whether or not IGMP Snooping is enabled. Status information is only displayed when IGMP Snooping is enabled.

Syntax
show ip igmp snooping

Default Setting

None

Command Mode

Privileged Exec

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Display Message

Admin Mode: This indicates whether or not IGMP Snooping is active on the switch.
Multicast Control Frame Count: This displays the number of multicast control frames that are processed by the CPU.
Interfaces Enabled for IGMP Snooping: This is the list of interfaces on which IGMP Snooping is enabled.
Vlan Enabled for IGMP Snooping: This is the list of interfaces on which IGMP Snooping is enabled.

show ip igmp snooping mrouter

This command displays information on statically configured and dynamically learned multicast router ports or multicast router configuration.

Syntax
show ip igmp snooping mrouter [{ vlan <vlanid> | interface [slot/port] }]

<vlanid> - VLAN ID (Range: 1 – 3965).

slot/port - The interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

VLAN ID: This displays VLAN ID value.
Slot/Port: The interface number.
Multicast Router Attached: This displays if the interface is enabled as a multicast router port.

show ip igmp snooping multicast

This command displays the known multicast address.

Syntax
show ip igmp snooping multicast [vlan <vlanid>] [static | dynamic]

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<vlanid> - VLAN ID (Range: 1 – 3965).

static - Displays only the configured multicast entries.

dynamic - Displays only entries learned through IGMP snooping.

Default Setting

None

Command Mode

Privileged Exec

Display Message

VLAN: This displays VLAN ID value.
MAC Addr: This displays multicast group MAC addresses.
Type: This displays the type of multicast group (Dynamic/Static).
Member Port: This displays the number of ports of this vlan and multicast group.

show ip igmp snooping

This command displays IGMP Snooping information. Configured information is displayed whether or not IGMP Snooping is enabled.

Syntax
show ip igmp snooping <1-3965>

<1-3965> - VLAN ID (Range: 1 – 3965).

Default Setting

None

Command Mode

Privileged Exec

Display Message

Vlan ID This is the list of VLANS on which IGMP Snooping is enabled.
IGMP Snooping Admin Mode This indicates whether or not IGMP Snooping is active on the VLAN.
Fast Leave Mode This indicates whether or not IGMP Snooping Fast-leave is active on the VLAN.
Group Membership Interval Time The Group Membership Interval time is the amount of time in seconds that a switch will wait for a report from a particular group on a particular interface, which is participating in the VLAN, before deleting the interface from the entry.This value may be configured

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Max Response Time This displays the amount of time the switch will wait after sending a query on an interface, participating in the VLAN, because it did not receive a report for a particular group on that interface. This value may be configured.
Multicast Router Expiration Time If a query is not received on an interface, participating in the VLAN, within this amount of time, the interface is removed from the list of interfaces with multicast routers attached. This value may be configured.

5.2.5.2 **Configuration Commands**

ip igmp snooping

This command enables IGMP Snooping on the system. The default value is disabled.

Syntax
ip igmp snooping
no igmp snooping

no - This command disables IGMP Snooping on the system.

Default Setting

Disabled

Command Mode

Global Config

ip igmp snooping groupmembershipinterval

This command sets the IGMP Group Membership Interval time on the system. The Group Membership Interval time is the amount of time in seconds that a switch will wait for a report from a particular group on a particular interface before deleting the interface from the entry. This value must be greater than the IGMP Maximum Response time value. The range is 1 to 3600 seconds.

Syntax
ip igmp snooping groupmembershipinterval <2-3600>
no ip igmp snooping groupmembershipinterval

<2-3600> - interval time (Range: 2 – 3600) in seconds.

no - This command sets the IGMP Group Membership Interval time on the system to 260 seconds.

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Default Setting

260 seconds

Command Mode

Global Config, Interface Config

ip igmp snooping interfacemode

This command enables IGMP Snooping on a selected interface. If an interface which has IGMP Snooping enabled is enabled for routing or is enlisted as a member of a port-channel (LAG), IGMP Snooping functionality will be disabled on that interface. IGMP Snooping functionality will subsequently be re-enabled if routing is disabled or port-channel (LAG) membership is removed from an interface that has IGMP Snooping enabled.

Syntax
ip igmp snooping interfacemode
no ip igmp snooping interfacemode

no - This command disables IGMP Snooping on a selected interface.

Default Setting

Disabled

Command Mode

Interface Config

This command enables IGMP Snooping on all interfaces. If an interface which has IGMP Snooping enabled is enabled for routing or is enlisted as a member of a port-channel (LAG), IGMP Snooping functionality will be disabled on that interface. IGMP Snooping functionality will subsequently be re-enabled if routing is disabled or port-channel (LAG) membership is removed from an interface that has IGMP Snooping enabled.

Syntax
ip igmp snooping interfacemode all

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all - All interfaces.

no - This command disables IGMP Snooping on all interfaces.

Default Setting

Disabled

Command Mode

Global Config

ip igmp snooping mcrtrexpiretime

This command sets the Multicast Router Present Expiration time on the system. This is the amount of time in seconds that a switch will wait for a query to be received on an interface before the interface is removed from the list of interfaces with multicast routers attached. The range is 0 to 3600 seconds. A value of 0 indicates an infinite timeout, that is, no expiration.

Syntax
ip igmp snooping mcrtrexpiretime <0-3600>
no ip igmp snooping mcrtrexpiretime

<0-3600> - Expiration time (Range: 0 – 3600).

no - This command sets the Multicast Router Present Expiration time on the system to 0. A value of 0 indicates an infinite timeout, that is no expiration.

Default Setting

0

Command Mode

Global Config, Interface Config

ip igmp snooping max-response-time

This command sets the IGMP Maximum Response time on the system. The Maximum Response time is the amount of time in seconds that a switch will wait after sending a query on an interface because it did not receive a report for a particular group in that interface. This value must be less than the IGMP Query Interval time value. The range is 1 to 3600 seconds.

Syntax
ip igmp snooping max-response-time <sec>
no ip igmp snooping max-response-time

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<sec> - Max time (Range: 1 – 3599).

no - This command sets the IGMP Maximum Response time on the system to 10 seconds.

Default Setting

10 seconds

Command Mode

Global Config, Interface Config.

ip igmp snooping immediate-leave

This command enables or disables IGMP Snooping fast-leave admin mode on a selected interface or on all interfaces. Enabling fastleave allows the switch to immediately remove the layer 2 LAN interface from its forwarding table entry upon receiving an IGMP leave message for that multicast group without first sending out MAC-based general queries to the interface(s).
Fast-leave admin mode should be enabled only on VLANs where only one host is connected to each layer 2 LAN port, to prevent the inadverdent dropping of the other hosts that were connected to the same layer 2 LAN port but were still interested in receiving multicast traffic directed to that group. Also, fast-leave processing is supported only with IGMP version 2 hosts.

Syntax
ip igmp snooping immediate-leave **no ip igmp snooping immediate-leave**

no - This command disables IGMP Snooping fast-leave admin mode.

Default Setting

Disabled

Command Mode

Global Config, Interface Config.

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ip igmp snooping mrouter

This command configures a selected interface as a multicast router interface. When configured as a multicast router interface, the interface is treated as a multicast router interface in all VLANs.

Syntax
ip igmp snooping mrouter interface
no ip igmp snooping mrouter interface

no - This command disables the status of the interface as a statically configured multicast router interface.

Default Setting

Disabled

Command Mode

Interface Config.

This command configures the VLAN ID(<vlanId>) that has the multicast router mode enabled.

Syntax
ip igmp snooping mrouter <vlanId>
no set igmp snooping mrouter <vlanId>

<vlanId> - VLAN ID.

no - This command disables the status of the interface as a statically configured multicast router interface.

Default Setting

Disabled

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Command Mode

Interface Config.

ip igmp snooping vlan static

This command is used to add a port to a multicast group.

Syntax
ip igmp snooping vlan <vlanid> static <macaddr> interface <slot/port>

<vlanid> - VLAN ID (Range: 1 – 3965).

<macaddr> - Multicast group MAC address.

<slot/port> - Interface number.

Default Setting

None

Command Mode

Global Config

Command Usage

The maximum number of static router ports that can be configured is 64.

set igmp

This command enables IGMP snooping on a particular VLAN, and in turn enabling IGMP snooping on all interfaces participating in this VLAN.

Syntax
set igmp <1-3965> **no set igmp <1-3965>**

<1-3965> - VLAN ID (Range: 1 – 3965).

no - This command disables IGMP snooping on a particular VLAN, and in turn disabling IGMP snooping on all interfaces participating in this VLAN.

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Default Setting

None

Command Mode

Vlan Database

set igmp groupmembership-interval

This command sets the IGMP Group Membership Interval on a particular VLAN. The Group Membership Interval time is the amount of time in seconds that a switch will wait for a report from a particular group on a particular interface, which is participating in the VLAN, before deleting the interface from the entry. This value must be greater than IGMP Maximum Response time value. The range is 2 to 3600 seconds.

Syntax
set igmp groupmembership-interval <1-3965> <2-3600> **no set igmp groupmembershipinterval <1-3965>**

<1-3965> - VLAN ID (Range: 1 – 3965).

<2-3600> - The range of group membership interval time is 2 to 3600 seconds.

no - This command sets the IGMP Group Membership Interval time on a particular VLAN to the default value.

Default Setting

260

Command Mode

Vlan Database

set igmp maxresponse

This command sets the IGMP Maximum Response time on a particular VLAN. The Maximum Response time is the amount of time in seconds that a switch will wait after sending a query on an interface, which is participating in the VLAN, because it did not receive a report for a particular group in that interface. This value must be less than the IGMP Query Interval time value.

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Syntax

set igmp maxresponse <1-3965> <1-3599>

no set igmp maxresponse <1-3965>

<1-3965> - VLAN ID (Range: 1 – 3965).

no - This command sets the IGMP maximum response time on a particular VLAN to the default value.

Default Setting

10

Command Mode

Vlan Database

set igmp mcrtexpiretime

This command sets the Multicast Router Present Expiration time on a particular VLAN. This is the amount of time in seconds that a switch will wait for a query to be received on an interface, which is participating in the VLAN, before the interface is removed from the list of interfaces with multicast routers attached. The range is 0 to 3600 seconds. A value of 0 indicates an infinite time-out, i.e. no expiration.

Syntax

set igmp mcrtexpiretime <1-3965> <0-3600>

no set igmp mcrtexpiretime <1-3965>

<1-3965> - VLAN ID (Range: 1 – 3965).

<0-3600> - The range of the Multicat Router Present Expire time is 0 to 3600 seconds.

no - This command sets the IGMP Multicast Router Present Expire time on a particular VLAN to the default value.

Default Setting

10

Command Mode

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Vlan Database

set igmp fast-leave

This command enables or disables IGMP Snooping fast-leave admin mode on a selected VLAN. Enabling fastleave allows the switch to immediately remove the layer 2 LAN interface, participating in the VLAN, from its forwarding table entry upon receiving an IGMP leave message for that multicast group without first sending out MAC-based general queries to the interface. Fast-leave admin mode should be enabled only on VLANs where only one host is connected to each layer 2 LAN port, to prevent the inadverdent dropping of the other hosts that were connected to the same layer 2 LAN port but were still interested in receiving multicast traffic directed to that group. Also, fast-leave processing is supported only with IGMP version 2 hosts.

Syntax
set igmp fast-leave <1-3965> **no set igmp fast-leave <1-3965>**

<1-3965> - VLAN ID (Range: 1 – 3965).

no - This command disables IGMP Snooping fast-leave admin mode on a selected VLAN.

Default Setting

None

Command Mode

Vlan Database

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5.2.6 **Port Channel**

5.2.6.1 **show port-channel**

This command displays the static capability of all port-channels (LAGs) on the device as well as a summary of individual port-channels.

Syntax
show port-channel

Default Setting

None

Command Mode

Privileged Exec

Display Message

For each port-channel the following information is displayed:
Logical Interface: The field displays logical slot and the logical port.
Port-Channel Name: This field displays the name of the port-channel.
Link State: This field indicates whether the link is up or down.
Mbr Ports: This field lists the ports that are members of this port-channel, in slot/port notation.
Active Ports: This field lists the ports that are actively participating in this port-channel.

This command displays an overview of all port-channels (LAGs) on the switch.

Syntax
show port-channel {<logical slot/port> | all}

<logical slot/port> - Port-Channel Interface number.

all – all Port-Channel interfaces.

Default Setting

None

Command Mode

Privileged Exec

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Display Message

Log. Intf: The logical slot and the logical port.
Port-Channel Name: The name of this port-channel (LAG). You may enter any string of up to 15 alphanumeric characters.
Link : Indicates whether the Link is up or down.
Admin Mode: May be enabled or disabled. The factory default is enabled.
Link Trap Mode: This object determines whether or not to send a trap when link status changes. The factory default is enabled.
STP Mode: The Spanning Tree Protocol Administrative Mode associated with the port or port channel (LAG). The possible values are:
Disable: Spanning tree is disabled for this port.
Enable: Spanning tree is enabled for this port. (Default Value)
Mbr Ports: A listing of the ports that are members of this port-channel (LAG), in slot/port notation. There can be a maximum of eight ports assigned to a given port-channel (LAG).
Port Speed: Speed of the port-channel port.
Type: This field displays the status designating whether a particular port-channel (LAG) is statically or dynamically maintained. The possible values of this field are Static, indicating that the port-channel is statically maintained; and Dynamic, indicating that the port-channel is dynamically maintained.
Port Active: This field lists the ports that are actively participating in the port-channel (LAG).

5.2.6.2 **port-channel**

This command configures a new port-channel (LAG) and generates a logical slot and port number for it. Display this number using the **show port-channel.**

Note: Before including a port in a port-channel, set the port physical mode. See **speed** command.

Syntax
port-channel <name>
no port-channel {<logical slot/port> | all}

<logical slot/port> - Port-Channel Interface number.

<name> - Port-Channel name (up to 15 alphanumeric characters).

all - all Port-Channel interfaces.

no - This command removes that Port-Channel.

Default Setting

None

Command Mode

Global Config

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Command Usage

1. Max number of port-channels could be created by user are 6 and Max. Number of members for each port-channel are 8.

5.2.6.3 **port-channel adminmode all**

This command sets every configured port-channel with the same administrative mode setting.

Syntax
port-channel adminmode all **no port-channel adminmode all**

no - This command disables a port-channel (LAG). The option **all** sets every configured port-channel with the same administrative mode setting.

Default Setting

Enabled

Command Mode

Global Config

5.2.6.4 **staticcapability**

This command enables the static function to support on specific port-channel (static link aggregations - LAGs) on the device. By default, the static capability for all of port-channels is disabled.

Syntax
staticcapability **no staticcapability**

no - This command disables to support static function on specific port-channel on this device.

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Default Setting

Disabled

Command Mode

Interface Config

5.2.6.5 **port-channel linktrap**

This command enables link trap notifications for the port-channel (LAG). The interface is a logical slot and port for a configured port-channel. The option **all** sets every configured port-channel with the same administrative mode setting.

Syntax
port-channel linktrap {<logical slot/port> | all} **no port-channel linktrap {<logical slot/port> | all}**

<logical slot/port> - Port-Channel Interface number.

all - all Port-Channel interfaces.

no - This command disables link trap notifications for the port-channel (LAG). The interface is a logical slot and port for a configured port-channel. The option **all** sets every configured port-channel with the same administrative mode setting.

Default Setting

Enabled

Command Mode

Global Config

5.2.6.6 **port-channel name**

This command defines a name for the port-channel (LAG). The interface is a logical slot and port for a configured port-channel, and name is an alphanumeric string up to 15 characters. This command is used to modify the name that was associated with the port-channel when it was created.

Syntax

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port-channel name {<logical slot/port> | all} <name>

<logical slot/port> - Port-Channel Interface number.

all - all Port-Channel interfaces.

<name> - Configured Port-Channel name (up to 15 characters).

Default Setting

None

Command Mode

Global Config

5.2.6.7 **adminmode**

This command enables a port-channel (LAG) members. The interface is a logical slot and port for a configured port-channel.

Syntax

adminmode

no adminmode

no - This command disables a configured port-channel (LAG).

Default Setting

Enabled

Command Mode

Interface Config

5.2.6.8 **lacp**

This command enables Link Aggregation Control Protocol (LACP) on a port.

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Syntax
lacp
no lacp

no - This command disables Link Aggregation Control Protocol (LACP) on a port.

Default Setting

Enabled

Command Mode

Interface Config

This command enables Link Aggregation Control Protocol (LACP) on all ports.

Syntax
lacp all
no lacp all

all - All interfaces.

no - This command disables Link Aggregation Control Protocol (LACP) on all ports.

Default Setting

Enabled

Command Mode

Global Config

5.2.6.9 **channel-group**

This command adds one port to the port-channel (LAG). The first interface is a logical slot and port number of a configured port-channel.

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Note: Before adding a port to a port-channel, set the physical mode of the port. See ‘speed’ command.

Syntax
channel-group <logical slot/port>

<logical slot/port> - Port-Channel Interface number.

Default Setting

None

Command Mode

Interface Config

Command Usage

1. The maximum number of members for each Port-Channel is 6.

5.2.6.10 **delete-channel-group**

This command deletes the port from the port-channel (LAG). The interface is a logical slot and port number of a configured port-channel.

Syntax
delete-channel-group <logical slot/port>

<logical slot/port> - Port-Channel Interface number.

Default Setting

None

Command Mode

Interface Config

This command deletes all configured ports from the port-channel (LAG). The interface is a logical slot and port number of a configured port-channel.

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Syntax
delete-channel-group <logical slot/port> all

<logical slot/port> - Port-Channel Interface number.

all - All members for specific Port-Channel.

Default Setting

None

Command Mode

Global Config

5.2.7 **Storm Control**

5.2.7.1 **show storm-control**

This command is used to display broadcast storm control information.

Syntax
show storm-control broadcast

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Displays interface number.

Mode: Displays status of storm control broadcast.

Level: Displays level for storm control broadcast.

Rate: Displays rate for storm control broadcast.

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This command is used to display multicast storm control information.

Syntax
show storm-control multicast

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Displays interface number.

Mode: Displays status of storm control multicast.

Level: Displays level for storm control multicast

Rate: Displays rate for storm control multicast.

This command is used to display unicast storm control information

Syntax
show storm-control unicast

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Displays interface number.

Mode: Displays status of storm control unicast.

Level: Displays level for storm control unicast

Rate: Displays rate for storm control unicast.

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5.2.7.2 **storm-control broadcast**

This command enables broadcast storm recovery mode on the selected interface. If the mode is enabled, broadcast storm recovery with high threshold is implemented. The threshold implementation follows a percentage pattern. If the broadcast traffic on any Ethernet port exceeds the high threshold percentage (as represented in “Broadcast Storm Recovery Thresholds” table) of the link speed, the switch discards the broadcasts traffic until the broadcast traffic returns to the threshold percentage or less. The full implementation is depicted in the “Broadcast Storm Recovery Thresholds” table.

Syntax
storm-control broadcast **no storm-control broadcast**

no - This command disables broadcast storm recovery mode on the selected interface. The threshold implementation follows a percentage pattern. If the broadcast traffic on any Ethernet port exceeds the high threshold percentage (as represented in “Broadcast Storm Recovery Thresholds” table) of the link speed, the switch discards the broadcasts traffic until the broadcast traffic returns to the threshold percentage or less. The full implementation is depicted in the “Broadcast Storm Recovery Thresholds” table.

Default Setting

Disabled

Command Mode

Interface Config

This command enables broadcast storm recovery mode on all interfaces.

Syntax
storm-control broadcast **no storm-control broadcast**

no - This command disables broadcast storm recovery mode on all interfaces.

Default Setting

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Disabled

Command Mode

Global Config

5.2.7.3 **storm-control multicast**

This command enables multicast storm recovery mode on the selected interface.

Syntax
storm-control multicast **no storm-control multicast**

no - This command disables multicast storm recovery mode on the selected interface.

Default Setting

None

Command Mode

Interface Config

This command enables multicast storm recovery mode on all interfaces.

Syntax
storm-control multicast **no storm-control multicast**

no - This command disables multicast storm recovery mode on all interfaces.

Default Setting

None

Command Mode

Global Config

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5.2.7.4 **storm-control unicast**

This command enables unicast storm recovery mode on the selected interface.

Syntax
storm-control unicast
no storm-control unicast

no - This command disables unicast storm recovery mode on the selected interface.

Default Setting

None

Command Mode

Interface Config

This command enables unicast storm recovery mode on all interfaces.

Syntax
storm-control unicast
no storm-control unicast

no - This command disables unicast storm recovery mode on all interfaces.

Default Setting

None

Command Mode

Global Config

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5.2.7.5 **switchport broadcast packet-rate**

This command will protect your network from broadcast storms by setting a threshold level for broadcast traffic on each port.

Syntax
switchport broadcast packet-rate {1 | 2 | 3 | 4}

1 - Threshold level represents 64 pps for 1G Port or 1042 pps for 10G port.

2 - Threshold level represents 128 pps for 1G Port or 2084 pps for 10G port.

3 - Threshold level represents 256 pps for 1G Port or 3124 pps for 10G port.

4 - Threshold level represents 512 pps for 1G Port or 4167 pps for 10G port.

Note: pps (packet per second)

Default Setting

Level 4

Command Mode

Interface Config

This command will protect your network from broadcast storms by setting a threshold level for broadcast traffic on all ports.

Syntax
switchport broadcast all packet-rate {1 | 2 | 3 | 4}

1 - Threshold level represents 64 pps for 1G Port or 1042 pps for 10G port.

2 - Threshold level represents 128 pps for 1G Port or 2084 pps for 10G port.

3 - Threshold level represents 256 pps for 1G Port or 3124 pps for 10G port.

4 - Threshold level represents 512 pps for 1G Port or 4167 pps for 10G port.

all - This command represents all interfaces.

Note: pps (packet per second)

Default Setting

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Level 4

Command Mode

Global Config

5.2.7.6 **switchport multicast packet-rate**

This command will protect your network from multicast storms by setting a threshold level for multicast traffic on each port.

Syntax
switchport multicast packet-rate {1 | 2 | 3 | 4}

1 - Threshold level represents 64 pps for 1G Port or 1042 pps for 10G port.

2 - Threshold level represents 128 pps for 1G Port or 2084 pps for 10G port.

3 - Threshold level represents 256 pps for 1G Port or 3124 pps for 10G port.

4 - Threshold level represents 512 pps for 1G Port or 4167 pps for 10G port.

Note: pps (packet per second)

Default Setting

Level 4

Command Mode

Interface Config

This command will protect your network from multicast storms by setting a threshold level for multicast traffic on all ports.

Syntax
switchport multicast all packet-rate {1 | 2 | 3 | 4}

1 - Threshold level represents 64 pps for 1G Port or 1042 pps for 10G port.

2 - Threshold level represents 128 pps for 1G Port or 2084 pps for 10G port.

3 - Threshold level represents 256 pps for 1G Port or 3124 pps for 10G port.

4 - Threshold level represents 512 pps for 1G Port or 4167 pps for 10G port.

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all - This command represents all interfaces.

Note: pps (packet per second)

Default Setting

Level 4

Command Mode

Global Config

5.2.7.7 **switchport unicast packet-rate**

This command will protect your network from unicast storms by setting a threshold level for unicast traffic on each port.

Syntax

switchport unicast packet-rate {1 | 2 | 3 | 4}

1 - Threshold level represents 64 pps for 1G Port or 1042 pps for 10G port.

2 - Threshold level represents 128 pps for 1G Port or 2084 pps for 10G port.

3 - Threshold level represents 256 pps for 1G Port or 3124 pps for 10G port.

4 - Threshold level represents 512 pps for 1G Port or 4167 pps for 10G port.

Note: pps (packet per second)

Default Setting

Level 4

Command Mode

Interface Config

This command will protect your network from unicast storms by setting a threshold level for unicast traffic on all ports.

Syntax

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switchport unicast all packet-rate {1 | 2 | 3 | 4}

1 - Threshold level represents 64 pps for 1G Port or 1042 pps for 10G port.

2 - Threshold level represents 128 pps for 1G Port or 2084 pps for 10G port.

3 - Threshold level represents 256 pps for 1G Port or 3124 pps for 10G port.

4 - Threshold level represents 512 pps for 1G Port or 4167 pps for 10G port.

all - This command represents all interfaces.

Note: pps (packet per second)

Default Setting

Level 4

Command Mode

Global Config

5.2.8 **L2 Priority**

5.2.8.1 **show queue cos-map**

This command displays the class of service priority map on specific interface.

Syntax
show queue cos-map [<slot/port>]

<slot/port> - Interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

User Priority: Displays the 802.1p priority to be mapped.

Traffic Class: Displays internal traffic class to map the corresponding 802.1p priority.

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5.2.8.2 **queue cos-map**

This command is used to assign class of service (CoS) value to the CoS priority queue.

Syntax
queue cos-map <priority> <queue-id> **no queue cos-map**

<queue-id> - The queue id of the CoS priority queue (Range: 0 - 7).

<priority> - The CoS value that is mapped to the queue id (Range: 0 - 7).

no - Sets the CoS map to the default values.

Default Setting

priority	queue
0	1
1	0
2	0
3	1
4	2
5	2
6	3
7	3

Command Mode

Interface Config

5.2.9 **Port Mirror**

5.2.9.1 **show port-monitor session**

This command displays the Port monitoring information for the specified session.

Syntax
show port-monitor session <Session Number>

< Session Number > - session number.

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Default Setting

None

Command Mode

Privileged Exec

Display Message

Session ID: indicates the session ID.
Admin Mode: indicates whether the Port Monitoring feature is enabled or disabled. The possible values are enabled and disabled.
Probe Port: is the slot/port that is configured as the probe port. If this value has not been configured, 'Not Configured' will be displayed.
Mirrored Port: is the slot/port that is configured as the monitored port. If this value has not been configured, 'Not Configured' will be displayed.

5.2.9.2 **port-monitor session**

This command configures a probe (destination) port or a mirrored (source) port for a monitor session (port monitoring). Users can add more than one mirrored port for a monitor session.

Syntax
port-monitor session <session-id> {(source | destination) interface <slot/port> } **no port-monitor session <session-id> { source | destination}**

<slot/port> - Interface number.

no - This command removes the probe port or the mirrored port from a monitor session (port monitoring).

Default Setting

None

Command Mode

Global Config

This command removes all configured probe ports and mirrored port.

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Syntax
no port-monitor

Default Setting

None

Command Mode

Global Config

5.2.9.3 **port-monitor session mode**

This command configures the administration mode of port-monitoring function for a monitor session.

Syntax
port-monitor session <session-id> mode
no port-monitor session <session-id> mode

<session-id> - Session ID.

no - This command disables port-monitoring function for a monitor session.

5.3 Management Commands

5.3.1 **Network Commands**

5.3.1.1 **show ip interface**

This command displays configuration settings associated with the switch's network interface. The network interface is the logical interface used for in-band connectivity with the switch via any of the switch's front panel ports. The configuration parameters associated with the switch's network interface do not affect the configuration of the front panel ports through which traffic is switched or routed.

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Syntax
show ip interface

Default Setting

None

Command Mode

Privileged Exec

Display Message

IP Address: The IP address of the interface. The factory default value is 0.0.0.0
Subnet Mask: The IP subnet mask for this interface. The factory default value is 0.0.0.0
Default Gateway: The default gateway for this IP interface. The factory default value is 0.0.0.0
Burned In MAC Address: The burned in MAC address used for in-band connectivity.
Network Configuration Protocol Current: Indicates which network protocol is being used. The options are bootp | dhcp | none.
DHCP Client Identifier TEXT: DCHP client identifier for this switch.
Management VLAN ID: Specifies the management VLAN ID.
Web Mode: Specifies whether the switch may be accessed from a Web browser. The factory default is enabled.
Web Port: This field is used to set the HTTP Port Number. The value must be in the range of 1 to 65535. Port 80 is the default value.
Java Mode: Specifies if the switch should allow access to the Java applet in the header frame. Enabled means the applet can be viewed. The factory default is disabled.

5.3.1.2 **show ip filter**

This command displays management IP filter status and all designated management stations.

Syntax
show ip filter

Default Setting

None

Command Mode

Privileged Exec

Display Message

Index: The index of stations.
IP Address: The IP address of stations that are allowed to make configuration changes to the switch.

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5.3.1.3 **show ip ipv6**

This command displays the IPv6 forwarding status of all ports.

Syntax
show ip ipv6

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf: Interface number
Type: Status of each interface for IPv6.

5.3.1.4 **mtu**

This command sets the maximum transmission unit (MTU) size (in bytes) for physical and port-channel (LAG) interfaces. For the standard implementation, the range of <1518-9216> is a valid integer between 1518-9216.

Syntax
mtu <1518-9216>
no mtu

<1518-9216> - Max frame size (Range: 1518 - 9216).

no - This command sets the default maximum transmission unit (MTU) size (in bytes) for the interface.

Default Setting

1518

Command Mode

Interface Config

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5.3.1.5 **interface vlan**

This command is used to enter Interface-vlan configuration mode.

Syntax
interface vlan <vlanid>

<vlanid> - VLAN ID (Range: 1 - 3965).

Default Setting

None

Command Mode

Global Config

5.3.1.6 **ip address**

This command sets the IP Address, and subnet mask. The IP Address and the gateway must be on the same subnet.

Syntax
ip address <ipaddr> <netmask>
no ip address

<ipaddr> - IP address

<netmask> - Subnet Mask

no - Restore the default IP address and Subnet Mask

Default Setting

IP address: 0.0.0.0

Subnet Mask: 0.0.0.0

Command Mode

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Interface-Vlan Config

Command Usage

Once the IP address is set, the VLAN ID's value will be assigned to management VLAN.

5.3.1.7 **ip default-gateway**

This command sets the IP Address of the default gateway.

Syntax
ip default-gateway <gateway> **no ip default-gateway**

< gateway > - IP address of the default gateway

no - Restore the default IP address of the default gateway

Default Setting

IP address: 0.0.0.0

Command Mode

Global Config

5.3.1.8 **ip address protocol**

This command specifies the network configuration protocol to be used. If you modify this value, the change is effective immediately.

Syntax
ip address protocol {bootp | dhcp | none}

<bootp> - Obtains IP address from BOOTP.

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<dhcp> - Obtains IP address from DHCP.

<none> - Obtains IP address by setting configuration.

Default Setting

None

Command Mode

Interface-Vlan Config

5.3.1.9 **ip filter**

This command is used to enable the IP filter function.

Syntax
ip filter **no ip filter**

no – Disable ip filter.

Default Setting

Disabled

Command Mode

Global Config

This command is used to set an IP address to be a filter.

Syntax
ip filter <ipaddr> **no ip filter <ipaddr>**

<ipaddr> - Configure a IP address to be a filter.

No - Remove this filter IP address.

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Default Setting

None

Command Mode

Global Config

5.3.1.10 **ip ipv6**

This command is used to enable the Ipv6 function on specific interface.

Syntax
ip ipv6 **no ip ipv6**

no - disable IPv6.

Default Setting

Enabled

Command Mode

Interface Config

This command is used to enable the Ipv6 function on all interfaces.

Syntax
ip ipv6 all **no ip ipv6 all**

all - All interfaces.

no - disable IPv6.

Default Setting

Enabled

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Command Mode

Global Config

5.3.2 Serial Interface Commands

5.3.2.1 show line console

This command displays serial communication settings for the switch.

Syntax
show line console

Default Setting

None

Command Mode

Privileged Exec

Display Message

Serial Port Login Timeout (minutes): Specifies the time, in minutes, of inactivity on a Serial port connection, after which the switch will close the connection. Any numeric value between 0 and 160 is allowed, the factory default is 5. A value of 0 disables the timeout.
Baud Rate: The default baud rate at which the serial port will try to connect. The available values are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bauds.
Character Size: The number of bits in a character. The number of bits is always 8.
Flow Control: Whether Hardware Flow-Control is enabled or disabled. Hardware Flow Control is always disabled.
Stop Bits: The number of Stop bits per character. The number of Stop bits is always 1.
Parity: The Parity Method used on the Serial Port. The Parity Method is always None.
Password Threshold: When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes.
Silent Time (sec): Use this command to set the amount of time the management console is inaccessible after the number of unsuccessful logon attempts exceeds the threshold set by the password threshold command.

5.3.2.2 line console

This command is used to enter Line configuration mode

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Syntax
line console

Default Setting

None

Command Mode

Global Config

5.3.2.3 **baudrate**

This command specifies the communication rate of the terminal interface. The supported rates are 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

Syntax
baudrate {1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200}
no baudrate

no - This command sets the communication rate of the terminal interface to **115200**.

Default Setting

115200

Command Mode

Line Config

5.3.2.4 **exec-timeout**

This command specifies the maximum connect time (in minutes) without console activity. A value of 0 indicates that a console can be connected indefinitely. The time range is 0 to 160.

Syntax
exec-timeout <0-160>

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<0-160> - max connect time (Range: 0 -160).

no - This command sets the maximum connect time (in minutes) without console activity to 5.

Default Setting

5

Command Mode

Line Config

5.3.2.5 **password-threshold**

This command is used to set the password instruction threshold limiting the number of failed login attempts.

Syntax
password-threshold <0-120> **no password-threshold**

<threshold> - max threshold (Range: 0 - 120).

no - This command sets the maximum value to the default.

Default Setting

3

Command Mode

Line Config

5.3.2.6 **silent-time**

This command uses to set the amount of time the management console is inaccessible after the number of unsuccessful logon tries exceeds the threshold value.

Syntax
silent-time <0-65535>

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<0-65535> - silent time (Range: 0 - 65535) in seconds.

no - This command sets the maximum value to the default.

Default Setting

0

Command Mode

Line Config

5.3.3 Telnet Session Commands

5.3.3.1 telnet

This command establishes a new outbound telnet connection to a remote host.

Syntax
telnet <host> [port] [debug] [line] [echo]

<host> - A hostname or a valid IP address.

[port] - A valid decimal integer in the range of 0 to 65535, where the default value is 23.

[debug] - Display current enabled telnet options.

[line] - Set the outbound telnet operational mode as 'linemode', where by default, the operational mode is 'character mode'.

[echo] - Enable local echo.

Default Setting

None

Command Mode

Privileged Exec

5.3.3.2 show line vty

This command displays telnet settings.

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Syntax
show line vty

Default Setting

None

Command Mode

Privileged Exec

Display Message

Remote Connection Login Timeout (minutes): This object indicates the number of minutes a remote connection session is allowed to remain inactive before being logged off. A zero means there will be no timeout. May be specified as a number from 0 to 160. The factory default is 5.
Maximum Number of Remote Connection Sessions: This object indicates the number of simultaneous remote connection sessions allowed. The factory default is 5.
Allow New Telnet Sessions: Indicates that new telnet sessions will not be allowed when set to no. The factory default value is yes.
Password Threshold: When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes.

5.3.3.3 **line vty**

This command is used to enter vty (Telnet) configuration mode.

Syntax
line vty

Default Setting

None

Command Mode

Global Config

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5.3.3.4 **exec-timeout**

This command sets the remote connection session timeout value, in minutes. A session is active as long as the session has been idle for the value set. A value of 0 indicates that a session remains active indefinitely. The time is a decimal value from 0 to 160.

Note: Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Syntax
exec-timeout <1-160> **no exec-timeout**

<sec> - max connect time (Range: 1 -160).

no - This command sets the remote connection session timeout value, in minutes, to the default.

Note: Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Default Setting

5

Command Mode

Telnet Config

5.3.3.5 **password-threshold**

This command is used to set the password instruction threshold limited for the number of failed login attempts.

Syntax
password-threshold <0-120> **no password-threshold**

<threshold> - max threshold (Range: 0 - 120).

no - This command sets the maximum value to the default.

Default Setting

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3

Command Mode

Telnet Config

5.3.3.6 **maxsessions**

This command specifies the maximum number of remote connection sessions that can be established. A value of 0 indicates that no remote connection can be established. The range is 0 to 5.

Syntax
maxsessions <0-5>
no maxsessions

<0-5> - max sessions (Range: 0 - 5).

no - This command sets the maximum value to be 5.

Default Setting

5

Command Mode

Telnet Config

5.3.3.7 **sessions**

This command regulates new telnet sessions. If sessions are enabled, new telnet sessions can be established until there are no more sessions available. If sessions are disabled, no new telnet sessions are established. An established session remains active until the session is ended or an abnormal network error ends it.

Syntax
sessions
no sessions

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no - This command disables telnet sessions. If sessions are disabled, no new telnet sessions are established.

Default Setting

Enabled

Command Mode

Telnet Config

5.3.3.8 **telnet sessions**

This command regulates new outbound telnet connections. If enabled, new outbound telnet sessions can be established until it reaches the maximum number of simultaneous outbound telnet sessions allowed. If disabled, no new outbound telnet session can be established. An established session remains active until the session is ended or an abnormal network error ends it.

Syntax
telnet sessions
no telnet sessions

no - This command disables new outbound telnet connections. If disabled, no new outbound telnet connection can be established.

Default Setting

Enabled

Command Mode

Global Config

5.3.3.9 **telnet maxsessions**

This command specifies the maximum number of simultaneous outbound telnet sessions. A value of 0 indicates that no outbound telnet session can be established.

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Syntax

telnet maxsessions <0-5>

no maxsessions

<0-5> - max sessions (Range: 0 - 5).

no - This command sets the maximum value to be 5.

Default Setting

5

Command Mode

Global Config

5.3.3.10 **telnet exec-timeout**

This command sets the outbound telnet session timeout value in minute.

Note: Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Syntax

telnet exec-timeout <1-160>

no telnet exec-timeout

<1-160> - max connect time (Range: 1 -160).

no - This command sets the remote connection session timeout value, in minutes, to the default.

Note: Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Default Setting

5

Command Mode

Global Config

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5.3.3.11 **show telnet**

This command displays the current outbound telnet settings.

Syntax
show telnet

Default Setting

None

Command Mode

User Exec, Privileged Exec

Display Message

Outbound Telnet Login Timeout (in minutes) Indicates the number of minutes an outbound telnet session is allowed to remain inactive before being logged off. A value of 0, which is the
default, results in no timeout.
Maximum Number of Outbound Telnet Sessions Indicates the number of simultaneous outbound telnet connections allowed.
Allow New Outbound Telnet Sessions Indicates whether outbound telnet sessions will be allowed.

5.3.4 **SNMP Server Commands**

5.3.4.1 **show snmp**

This command displays SNMP community information.

Six communities are supported. You can add, change, or delete communities. The switch does not have to be reset for changes to take effect.

The SNMP agent of the switch complies with SNMP versions 1, 2c, and 3 (for more about the SNMP specification, see the SNMP RFCs). The SNMP agent sends traps through TCP/IP to an external SNMP manager based on the SNMP configuration (the trap receiver and other SNMP community parameters).

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Syntax
show snmp

Default Setting

None

Command Mode

Privileged Exec

Display Message

SNMP Community Name: The community string to which this entry grants access. A valid entry is a case-sensitive alphanumeric string of up to 16 characters. Each row of this table must contain a unique community name.
Client IP Address: An IP address (or portion thereof) from which this device will accept SNMP packets with the associated community. The requesting entity's IP address is ANDed with the Subnet Mask before being compared to the IP Address. Note: that if the Subnet Mask is set to 0.0.0.0, an IP Address of 0.0.0.0 matches all IP addresses. The default value is 0.0.0.0
Client IP Mask: A mask to be ANDed with the requesting entity's IP address before comparison with IP Address. If the result matches with the IP Address then the address is an authenticated IP address. For example, if the IP Address = 9.47.128.0 and the corresponding Subnet Mask = 255.255.255.0, a range of incoming IP addresses would match. That is, the incoming IP Address could equal 9.47.128.0 - 9.47.128.255. The default value is 0.0.0.0.
Access Mode: The access level for this community string.
Status: The status of this community access entry.

5.3.4.2 **show trapflags**

This command displays trap conditions. Configure which traps the switch should generate by enabling or disabling the trap condition. If a trap condition is enabled and the condition is detected, the switch's SNMP agent sends the trap to all enabled trap receivers. The switch does not have to be reset to implement the changes. Cold and warm start traps are always generated and cannot be disabled.

Syntax
show trapflags

Default Setting

None

Command Mode

Privileged Exec

Display Message

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Authentication Flag: May be enabled or disabled. The factory default is enabled. Indicates whether authentication failure traps will be sent.
Link Up/Down Flag: May be enabled or disabled. The factory default is enabled. Indicates whether link status traps will be sent.
Multiple Users Flag: May be enabled or disabled. The factory default is enabled. Indicates whether a trap will be sent when the same user ID is logged into the switch more than once at the same time (either via telnet or serial port).
Spanning Tree Flag: May be enabled or disabled. The factory default is enabled. Indicates whether spanning tree traps will be sent.
DVMRP Traps May be enabled or disabled. The factory default is disabled. Indicates whether DVMRP traps will be sent.
OSPF Traps May be enabled or disabled. The factory default is disabled. Indicates whether OSPF traps will be sent.
PIM Traps May be enabled or disabled. The factory default is disabled. Indicates whether PIM traps will be sent.

5.3.4.3 **snmp-server sysname**

This command sets the name of the switch. The range for name is from 1 to 31 alphanumeric characters.

Syntax
snmp-server sysname <name>

<name> - Range is from 1 to 31 alphanumeric characters.

Default Setting

None

Command Mode

Global Config

5.3.4.4 **snmp-server location**

This command sets the physical location of the switch. The range for name is from 1 to 31 alphanumeric characters.

Syntax

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snmp-server location <loc>

<loc> - range is from 1 to 31 alphanumeric characters.

Default Setting

None

Command Mode

Global Config

5.3.4.5 **snmp-server contact**

This command sets the organization responsible for the network. The range for contact is from 1 to 31 alphanumeric characters.

Syntax
snmp-server contact <con>

<con> - Range is from 1 to 31 alphanumeric characters.

Default Setting

None

Command Mode

Global Config

5.3.4.6 **snmp-server community**

This command adds (and names) a new SNMP community. A community name is a name associated with the switch and with a set of SNMP managers that manage it with a specified privilege level. The length of the name can be up to 16 case-sensitive characters.

Note: Community names in the SNMP community table must be unique. If you make multiple entries using the same community name, the first entry is kept and processed and all duplicate entries are ignored.

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Syntax

snmp-server community <name>

no snmp-server community <name>

<name> - community name (up to 16 case-sensitive characters).

no - This command removes this community name from the table. The name is the community name to be deleted.

Default Setting

Two default community names: public and private. You can replace these default community names with unique identifiers for each community. The default values for the remaining four community names are blank.

Command Mode

Global Config

This command activates an SNMP community. If a community is enabled, an SNMP manager associated with this community manages the switch according to its access right. If the community is disabled, no SNMP requests using this community are accepted. In this case the SNMP manager associated with this community cannot manage the switch until the Status is changed back to Enable.

Syntax

snmp-server community mode <name>

no snmp-server community mode <name>

<name> - community name.

no - This command deactivates an SNMP community. If the community is disabled, no SNMP requests using this community are accepted. In this case the SNMP manager associated with this community cannot manage the switch until the Status is changed back to Enable.

Default Setting

The default public and private communities are enabled by default. The four undefined communities are disabled by default.

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Command Mode

Global Config

This command sets a client IP mask for an SNMP community. The address is the associated community SNMP packet sending address and is used along with the client IP address value to denote a range of IP addresses from which SNMP clients may use that community to access the device. A value of 255.255.255.255 will allow access from only one station, and will use that machine's IP address for the client IP Address. A value of 0.0.0.0 will allow access from any IP address. The name is the applicable community name.

Syntax
snmp-server community ipmask <ipmask> <name> **no snmp-server community ipmask <name>**

<name> - community name.

<ipmask> - a client IP mask.

no - This command sets a client IP mask for an SNMP community to **0.0.0.0**. The name is the applicable community name. The community name may be up to 16 alphanumeric characters.

Default Setting

0.0.0.0

Command Mode

Global Config

This command restricts access to switch information. The access mode is read-only (also called public) or read/write (also called private).

Syntax
snmp-server community {ro | rw} <name>

<name> - community name.

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<ro> - access mode is read-only.

<rw> - access mode is read/write.

Default Setting

None

Command Mode

Global Config

5.3.4.7 **snmp-server host**

This command sets a client IP address for an SNMP community. The address is the associated community SNMP packet sending address and is used along with the client IP mask value to denote a range of IP addresses from which SNMP clients may use that community to access the device. A value of 0.0.0.0 allows access from any IP address. Otherwise, this value is ANDed with the mask to determine the range of allowed client IP addresses. The name is the applicable community name.

Syntax
snmp-server host <ipaddr> <name> **no snmp-server host <name>**

<name> - community name.

<ipaddr> - a client IP address.

no - This command sets a client IP address for an SNMP community to **0.0.0.0**. The name is the applicable community name.

Default Setting

0.0.0.0

Command Mode

Global Config

5.3.4.8 **snmp-server enable traps**

This command enables the Authentication trap.

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Syntax

snmp-server enable traps authentication

no snmp-server enable traps authentication

no - This command disables the Authentication trap.

Default Setting

Enabled

Command Mode

Global Config

This command enables the DVMRP trap.

Syntax

snmp-server enable traps dvmrp

no snmp-server enable traps dvmrp

no - This command disables the DVMRP trap.

Default Setting

Enabled

Command Mode

Global Config

This command enables Link Up/Down traps for the entire switch. When enabled, link traps are sent only if the Link Trap flag setting associated with the port is enabled (see 'snmp trap link-status' command).

Syntax

snmp-server enable traps linkmode

no snmp-server enable traps linkmode

no - This command disables Link Up/Down traps for the entire switch.

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Default Setting

Enabled

Command Mode

Global Config

This command enables Multiple User traps. When the traps are enabled, a Multiple User Trap is sent when a user logs in to the terminal interface (EIA 232 or telnet) and there is an existing terminal interface session.

Syntax
snmp-server enable traps multiusers
no snmp-server enable traps multiusers

no - This command disables Multiple User trap.

Default Setting

Enabled

Command Mode

Global Config

This command enables OSPF traps.

Syntax
snmp-server enable traps ospf
no snmp-server enable traps ospf

no - This command disables OSPF trap.

Default Setting

Enabled

Command Mode

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Global Config

This command enables PIM traps.

Syntax
snmp-server enable traps pim
no snmp-server enable traps pim

no - This command disables PIM trap.

Default Setting

Enabled

Command Mode

Global Config

This command enables the sending of new root traps and topology change notification traps.

Syntax
snmp-server enable traps stpmode
no snmp-server enable traps stpmode

no - This command disables the sending of new root traps and topology change notification traps.

Default Setting

Enabled

Command Mode

Global Config

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5.3.5 SNMP Trap Commands

5.3.5.1 show snmptrap

This command displays SNMP trap receivers. Trap messages are sent across a network to an SNMP Network Manager. These messages alert the manager to events occurring within the switch or on the network. Six trap receivers are simultaneously supported.

Syntax
show snmptrap

Default Setting

None

Command Mode

Privileged Exec

Display Message

SNMP Trap Name: The community string of the SNMP trap packet sent to the trap manager. This may be up to 16 alphanumeric characters. This string is case sensitive.
IP Address: The IP address to receive SNMP traps from this device. Enter 4 numbers between 0 and 255 separated by periods.
SNMP Version: The trap version to be used by the receiver.
SNMP v1 – Uses SNMP v1 to send traps to the receiver
SNMP v2 – Uses SNMP v2 to send traps to the receiver
Status: A pull down menu that indicates the receiver's status (enabled or disabled) and allows the administrator/user to perform actions on this user entry:
Enable: send traps to the receiver
Disable: do not send traps to the receiver.
Delete: remove the table entry.

5.3.5.2 snmp trap link-status

This command enables link status traps by interface.

Note: This command is valid only when the Link Up/Down Flag is enabled. See ‘snmpserver enable traps linkmode’ command.

Syntax
snmp trap link-status

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no snmp trap link-status

no - This command disables link status traps by interface.

Note: This command is valid only when the Link Up/Down Flag is enabled. (See 'snmpserver enable traps linkmode' command.)

Default Setting

Disabled

Command Mode

Interface Config

This command enables link status traps for all interfaces.

Note: This command is valid only when the Link Up/Down Flag is enabled (See 'snmpserver enable traps linkmode' command.)

Syntax

snmp trap link-status all

no snmp trap link-status all

all - All interfaces.

no - This command disables link status traps for all interfaces.

Note: This command is valid only when the Link Up/Down Flag is enabled (see "snmpserver enable traps linkmode").

Default Setting

Disabled

Command Mode

Global Config

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5.3.5.3 **snmptrap <name> <ipaddr>**

This command adds an SNMP trap name. The maximum length of the name is 16 case-sensitive alphanumeric characters.

Syntax
snmptrap <name> <ipaddr> **no snmptrap <name> <ipaddr>**

<name> - SNMP trap name (Range: up to 16 case-sensitive alphanumeric characters).

<ipaddr> - an IP address of the trap receiver.

no - This command deletes trap receivers for a community.

Default Setting

None

Command Mode

Global Config

5.3.5.4 **snmptrap ipaddr**

This command changes the IP address of the trap receiver for the specified community name. The maximum length of name is 16 case-sensitive alphanumeric characters.

Note: IP addresses in the SNMP trap receiver table must be unique for the same community name. If you make multiple entries using the same IP address and community name, the first entry is retained and processed. All duplicate entries are ignored.

Syntax
snmptrap ipaddr <name> <ipaddr> <ipaddrnew>

<name> - SNMP trap name.

<ipaddr> - an original IP address.

<ipaddrnew> - a new IP address.

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Default Setting

None

Command Mode

Global Config

5.3.5.5 **snmptrap mode**

This command activates or deactivates an SNMP trap. Enabled trap receivers are active (able to receive traps). Disabled trap receivers are inactive (not able to receive traps).

Syntax
snmptrap mode <name> <ipaddr> **no snmptrap mode <name> <ipaddr>**

<name> - SNMP trap name.

<ipadd> - an IP address.

no - This command deactivates an SNMP trap. Trap receivers are inactive (not able to receive traps).

Default Setting

None

Command Mode

Global Config

5.3.6 **HTTP commands**

5.3.6.1 **show ip http**

This command displays the http settings for the switch.

Syntax
show ip http

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Default Setting

None

Command Mode

Privileged Exec

Display Message

HTTP Mode (Unsecure): This field indicates whether the HTTP mode is enabled or disabled.

HTTP Port: This field specifies the port configured for HTTP.

HTTP Mode (Secure): This field indicates whether the administrative mode of secure HTTP is enabled or disabled.
Secure Port: This field specifies the port configured for SSLT.
Secure Protocol Level(s): The protocol level may have the values of SSL3, TSL1, or both SSL3 and TSL1.

5.3.6.2 **ip javamode**

This command specifies whether the switch should allow access to the Java applet in the header frame of the Web interface. When access is enabled, the Java applet can be viewed from the Web interface. When access is disabled, the user cannot view the Java applet.

Syntax
ip javamode
no ip javamode

no - This command disallows access to the Java applet in the header frame of the Web interface. When access is disabled, the user cannot view the Java applet.

Default Setting

Enabled

Command Mode

Global Config

5.3.6.3 **ip http port**

This command is used to set the http port where port can be 1-65535 and the default is port 80.

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Syntax
ip http port <1-65535> **no ip http port**

<1-65535> - HTTP Port value.

no - This command is used to reset the http port to the default value.

Default Setting

80

Command Mode

Global Config

5.3.6.4 **ip http server**

This command enables access to the switch through the Web interface. When access is enabled, the user can login to the switch from the Web interface. When access is disabled, the user cannot login to the switch's Web server.

Disabling the Web interface takes effect immediately. All interfaces are affected.

Syntax
ip http server **no ip http server**

no - This command disables access to the switch through the Web interface. When access is disabled, the user cannot login to the switch's Web server.

Default Setting

Enabled

Command Mode

Global Config

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5.3.6.5 **ip http secure-port**

This command is used to set the SSLT port where port can be 1-65535 and the default is port 443.

Syntax
ip http secure-port <portid>
no ip http secure-port

<portid> - SSLT Port value.

no - This command is used to reset the SSLT port to the default value.

Default Setting

443

Command Mode

Global Config

5.3.6.6 **ip http secure-server**

This command is used to enable the secure socket layer for secure HTTP.

Syntax
ip http secure-server
no ip http secure-server

no - This command is used to disable the secure socket layer for secure HTTP.

Default Setting

Disabled

Command Mode

Global Config

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5.3.6.7 **ip http secure-protocol**

This command is used to set protocol levels (versions). The protocol level can be set to TLS1, SSL3 or to both TLS1 and SSL3.

Syntax
ip http secure-protocol <protocollevel1> [protocollevel2]
no ip http secure-protocol <protocollevel1> [protocollevel2]

<protocollevel1 - 2> - The protocol level can be set to TLS1, SSL3 or to both TLS1 and SSL3.

no - This command is used to remove protocol levels (versions) for secure HTTP.

Default Setting

SSL3 and TLS1

Command Mode

Global Config

5.3.7 **Secure Shell (SSH) Commands**

5.3.7.1 **show ip ssh**

This command displays the SSH settings.

Syntax
show ip ssh

Default Setting

None

Command Mode

Privileged Exec

Display Message

Administrative Mode: This field indicates whether the administrative mode of SSH is enabled or disabled.
Protocol Levels: The protocol level may have the values of version 1, version 2, or both versions.
SSH Sessions Currently Active: This field specifies the current number of SSH connections.

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Max SSH Sessions Allowed: The maximum number of inbound SSH sessions allowed on the switch.
SSH Timeout: This field is the inactive timeout value for incoming SSH sessions to the switch.

5.3.7.2 **ip ssh**

This command is used to enable SSH.

Syntax
ip ssh **no ip ssh**

no - This command is used to disable SSH.

Default Setting

Disabled

Command Mode

Global Config

5.3.7.3 **ip ssh protocol**

This command is used to set or remove protocol levels (or versions) for SSH. Either SSH1 (1), SSH2 (2), or both SSH 1 and SSH 2 (1 and 2) can be set.

Syntax
ip ssh protocol <protocollevel1> [protocollevel2]

<protocollevel1 - 2> - The protocol level can be set to SSH1, SSH2 or to both SSH 1 and SSH 2.

Default Setting

SSH1 and SSH2

Command Mode

Global Config

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5.3.7.4 **ip ssh maxsessions**

This command specifies the maximum number of SSH connection sessions that can be established. A value of 0 indicates that no ssh connection can be established. The range is 0 to 5.

Syntax
ip ssh maxsessions <0-5>
no ip ssh maxsessions

<0-5> - maximum number of sessions.

no - This command sets the maximum number of SSH connection sessions that can be established to the default value.

Default Setting

SSH1 and SSH2

Command Mode

Global Config

5.3.7.5 **ip ssh timeout**

This command sets the SSH connection session timeout value, in minutes. A session is active as long as the session has been idle for the value set. A value of 0 indicates that a session remains active indefinitely. The time is a decimal value from 0 to 160. Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Syntax
ip ssh timeout <1-160>
no ip ssh timeout

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<1-160> - timeout interval in seconds.

no - This command sets the SSH connection session timeout value, in minutes, to the default. Changing the timeout value for active sessions does not become effective until the session is reaccessed. Any keystroke will also activate the new timeout duration.

Default Setting

5

Command Mode

Global Config

5.3.8 DHCP Client Commands

5.3.8.1 ip dhcp restart

This command is used to initiate a BOOTP or DCHP client request.

Syntax
ip dhcp restart

Default Setting

None

Command Mode

Global Config

5.3.8.2 ip dhcp client-identifier

This command is used to specify the DCHP client identifier for this switch. Use the **no** form to restore to default value.

Syntax
ip dhcp client-identifier {text <text> | hex <hex>}

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no ip dhcp client-identifier

<text> - A text string. (Range: 1-15 characters).

<hex> - The hexadecimal value (00:00:00:00:00:00).

no - This command is used to restore to default value.

Default Setting

System Burned In MAC Address

Command Mode

Global Config

5.3.9 DHCP Relay Commands

5.3.9.1 Show bootpdhcprelay

This command is used to display the DHCP relay agent configuration information on the system.

Syntax
show bootpdhcprelay

Default Setting

None

Command Mode

Privileged Exec

Display Message

Maximum Hop Count - The maximum number of Hops a client request can go without being discarded.

Minimum Wait Time (Seconds) - The Minimum time in seconds. This value will be compared to the time stamp in the client's request packets, which should represent the time since the client was powered up. Packets will only be forwarded when the time stamp exceeds the minimum wait time.

Admin Mode - Administrative mode of the relay. When you select 'enable' BOOTP/DHCP requests will be forwarded to the IP address you entered in the 'Server IP address' field.

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Server IP Address - IP address of the BOOTP/DHCP server or the IP address of the next BOOTP/DHCP Relay Agent.

Circuit Id Option Mode - This is the Relay agent option which can be either enabled or disabled. When enabled Relay Agent options will be added to requests before they are forwarded to the server and removed from replies before they are forwarded to clients.

Requests Received - The total number of BOOTP/DHCP requests received from all clients since the last time the switch was reset.

Requests Relayed - The total number of BOOTP/DHCP requests forwarded to the server since the last time the switch was reset.

Packets Discarded - The total number of BOOTP/DHCP packets discarded by this Relay Agent since the last time the switch was reset.

5.3.9.2 **Bootpdhcprelay maxhopcount**

This command is used to set the maximum relay agent hops for BootP/DHCP Relay on the system.

Syntax
bootpdhcprelay maxhopcount <1-16> **no bootpdhcprelay maxhopcount**

<1-16> - maximum number of hops. (Range: 1-16).

no - This command is used to reset to the default value.

Default Setting

4

Command Mode

Global Config

5.3.9.3 **Bootpdhcprelay serverip**

This command is used to configure the server IP Address for BootP/DHCP Relay on the system.

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Syntax
bootpdhcprelay serverip <ipaddr> **no bootpdhcprelay serverip**

<ipaddr> - A server IP address.

no - This command is used to reset to the default value.

Default Setting

IP 0.0.0.0

Command Mode

Global Config

5.4 Spanning Tree Commands

This section provides detailed explanation of the spanning tree commands. The commands are divided into two functional groups:

- Show commands display spanning tree settings, statistics, and other information.
- Configuration Commands configure features and options of the switch. For every configuration command there is a show command that displays the configuration setting.

5.4.1 **Show Commands**

5.4.1.1 **show spanning-tree**

This command displays spanning tree settings for the common and internal spanning tree. The following details are displayed.

Syntax
show spanning-tree

Default Setting

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None

Command Mode

Privileged Exec

Display Message

Bridge Priority: Configured value.
Bridge Identifier: The MAC Address for the Bridge from which the Bridge Identifiers used by the Spanning Tree Algorithm and Protocol.

Time Since Topology Change: In seconds.
Topology Change Count: Number of times changed.
Topology Change in progress: Boolean value of the Topology Change parameter for the switch indicating if a topology change is in progress on any port assigned to the common and internal spanning tree.
Designated Root: The Bridge Identifier of the Root Bridge for the spanning tree instance identified by the MSTID.
Root Path Cost: Value of the Root Path Cost parameter for the common and internal spanning tree.
Root Port Identifier: The Root Port for the spanning tree instance identified by the MSTID.
Bridge Max Age: Maximum message age.
Bridge Max Hops: The maximum number of hops for the spanning tree.
Bridge Forwarding Delay: A timeout value to be used by all Bridges in the Bridged LAN. The value of Forward Delay is set by the Root.
Hello Time: The time interval between the generations of Configuration BPDUs.
Bridge Hold Time: Minimum time between transmissions of Configuration Bridge Protocol Data Units (BPDUs).
CST Regional Root: The Bridge Identifier of the current CST Regional Root.
Regional Root Path Cost: The path cost to the regional root.
Associated FIDs: List of forwarding database identifiers currently associated with this instance.
Associated VLANs: List of VLAN IDs currently associated with this instance.

5.4.1.2 **show spanning-tree interface**

This command displays the settings and parameters for a specific switch port within the common and internal spanning tree. The <slot/port> is the desired switch port. The following details are displayed on execution of the command.

Syntax
show spanning-tree interface <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

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Privileged Exec

Display Message

Port Mode: The administration mode of spanning tree.
Port Up Time Since Counters Last Cleared: Time since the port was reset, displayed in days, hours, minutes, and seconds.
STP BPDUs Transmitted: Spanning Tree Protocol Bridge Protocol Data Units sent.
STP BPDUs Received: Spanning Tree Protocol Bridge Protocol Data Units received.
RST BPDUs Transmitted: Rapid Spanning Tree Protocol Bridge Protocol Data Units sent.
RST BPDUs Received: Rapid Spanning Tree Protocol Bridge Protocol Data Units received.
MSTP BPDUs Transmitted: Multiple Spanning Tree Protocol Bridge Protocol Data Units sent.
MSTP BPDUs Received: Multiple Spanning Tree Protocol Bridge Protocol Data Units received.

5.4.1.3 **show spanning-tree vlan**

This command displays the association between a VLAN and a multiple spanning tree instance. The <1-3965> corresponds to an existing VLAN ID.

Syntax
show spanning-tree vlan <1-3965>

<vlanid> - VLAN ID (Range: 1 - 3965).

Default Setting

None

Command Mode

Privileged Exec

Display Message

VLAN Identifier: displays VLAN ID.
Associated Instance: Identifier for the associated multiple spanning tree instance or "CST" if associated with the common and internal spanning tree.

5.4.1.4 **show spanning-tree mst**

This command displays settings and parameters for the specified multiple spanning tree instance. The instance <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance ID. The following details are displayed.

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Syntax

show spanning-tree mst detailed <0-4094>

<0-4094> - multiple spanning tree instance ID.

Default Setting

None

Command Mode

Privileged Exec

Display Message

MST Instance ID: The multiple spanning tree instance ID.
MST Bridge Priority: The bridge priority of current MST.
MST Bridge Identifier: The bridge ID of current MST.
Time Since Topology Change: In seconds.
Topology Change Count: Number of times the topology has changed for this multiple spanning tree instance.
Topology Change in Progress: Value of the Topology Change parameter for the multiple spanning tree instance.
Designated Root: Identifier of the Regional Root for this multiple spanning tree instance.
Root Path Cost: Path Cost to the Designated Root for this multiple spanning tree instance.
Root Port Identifier: Port to access the Designated Root for this multiple spanning tree instance
Associated FIDs: List of forwarding database identifiers associated with this instance.
Associated VLANs: List of VLAN IDs associated with this instance.

This command displays summary information about all multiple spanning tree instances in the switch. On execution, the following details are displayed.

Syntax

show spanning-tree mst summary

Default Setting

None

Command Mode

Privileged Exec

Display Message

MST Instance ID List: List of multiple spanning trees IDs currently configured.

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For each MSTID: The multiple spanning tree instance ID.
Associated FIDs: List of forwarding database identifiers associated with this instance.
Associated VLANs: List of VLAN IDs associated with this instance.

This command displays the detailed settings and parameters for a specific switch port within a
particular multiple spanning tree instance. The instance <mstid> is a number that corresponds to the desired existing multiple spanning tree instance. The <slot/port> is the desired switch port.

Syntax

show spanning-tree mst port detailed <0-4094> <slot/port>

<0-4094> - multiple spanning tree instance ID.

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

MST Instance ID: The multiple spanning tree instance ID.
Port Identifier: The unique value to identify a port on that Bridge.
Port Priority: The priority of the port within the MST.
Port Forwarding State: Current spanning tree state of this port.
Port Role: Indicate the port role is root or designate.
Auto-calculate Port Path Cost: Indicate the port auto-calculate port path cost.
Port Path Cost: Configured value of the Internal Port Path Cost parameter.
Designated Root: The Identifier of the designated root for this port.
Designated Port Cost: Path Cost offered to the LAN by the Designated Port.
Designated Bridge: Bridge Identifier of the bridge with the Designated Port.
Designated Port Identifier: Port on the Designated Bridge that offers the lowest cost to the LAN.

If 0 (defined as the default CIST ID) is passed as the <0-4094>, then this command displays the settings and parameters for a specific switch port within the common and internal spanning tree. The <slot/port> is the desired switch port. In this case, the following are displayed.

Port Identifier: The port identifier for this port within the CST.
Port Priority: The priority of the port within the CST.
Port Forwarding State: The forwarding state of the port within the CST.
Port Role: The role of the specified interface within the CST.

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Auto-calculate Port Path Cost: Indicate the port auto-calculate port path cost
Auto-calculate External Port Path Cost - Displays whether the external path cost is automatically calculated (Enabled) or not (Disabled). External Path cost will be calculated based on the link speed of the port if the configured value for External Port Path Cost is zero.
External Port Path Cost - The External Path Cost of the specified port in the spanning tree.
Port Path Cost: The configured path cost for the specified interface.
Designated Root: Identifier of the designated root for this port within the CST.
Designated Port Cost: Path Cost offered to the LAN by the Designated Port.
Designated Bridge: The bridge containing the designated port.
Designated Port Identifier: Port on the Designated Bridge that offers the lowest cost to the LAN.
Topology Change Acknowledgement: Value of flag in next Configuration Bridge Protocol Data Unit (BPDU) transmission indicating if a topology change is in progress for this port.
Hello Time: The hello time in use for this port.
Edge Port: The configured value indicating if this port is an edge port.
Edge Port Status: The derived value of the edge port status. True if operating as an edge port; false otherwise.
Point To Point MAC Status: Derived value indicating if this port is part of a point to point link.
CST Regional Root: The regional root identifier in use for this port.
CST Port Cost: The configured path cost for this port.

This command displays the settings of one or all ports within the specified multiple spanning tree instance. The parameter <0-4094> indicates a particular MST instance. The parameter {<slot/port> | all} indicates the desired switch port or all ports.

If 0 (defined as the default CIST ID) is passed as the <0-4094>, then the status summary is displayed for one or all ports within the common and internal spanning tree.

Syntax

show spanning-tree mst port summary <0-4094> {<slot/port> | all}

<0-4094> - multiple spanning tree instance ID.

<slot/port> - is the desired interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

MST Instance ID: The MST instance associated with this port.
Interface: The interface being displayed.

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STP Mode: Indicate STP mode.
Type: Currently not used.
STP State: The forwarding state of the port in the specified spanning tree instance.
Port Role: The role of the specified port within the spanning tree.

5.4.1.5 **show spanning-tree summary**

This command displays spanning tree settings and parameters for the switch. The following details are displayed on execution of the command.

Syntax
show spanning-tree summary

Default Setting

None

Command Mode

Privileged Exec

Display Message

Spanning Tree Adminmode: Enabled or disabled.
Spanning Tree Version: Version of 802.1 currently supported (IEEE 802.1s, IEEE 802.1w, or IEEE 802.1d) based upon the Force Protocol Version parameter.
Configuration Name: TConfigured name.
Configuration Revision Level: Configured value.
Configuration Digest Key: Calculated value.
Configuration Format Selector: Configured value.
MST Instances: List of all multiple spanning tree instances configured on the switch.

5.4.1.6 **show spanning-tree brief**

This command displays spanning tree settings for the bridge. In this case, the following details are displayed.

Syntax
show spanning-tree brief

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Default Setting

None

Command Mode

Privileged Exec

Display Message

Bridge Priority: Configured value.
Bridge Identifier: The bridge ID of current Spanning Tree.
Bridge Max Age: Configured value.
Bridge Hello Time: Configured value.
Bridge Forward Delay: Configured value.
Bridge Hold Time: Minimum time between transmission of Configuration Bridge Protocol Data Units (BPDUs).

5.4.2 Configuration Commands

5.4.2.1 spanning-tree

This command sets the spanning-tree operational mode to be enabled.

Syntax
spanning-tree **no spanning-tree**

no - This command sets the spanning-tree operational mode to be disabled. While disabled, the spanning-tree configuration is retained and can be changed, but is not activated.

Default Setting

Disabled

Command Mode

Global Config

5.4.2.2 spanning-tree protocol-migration

This command enables BPDU migration check on a given interface. The **all** option enables BPDU migration check on all interfaces.

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Syntax
spanning-tree protocol-migration {<slot/port> | all}
no spanning-tree protocol-migration {<slot/port> | all}

<slot/port> - is the desired interface number.

all - All interfaces.

no - This command disables BPDU migration check on a given interface. The **all** option disables BPDU migration check on all interfaces.

Default Setting

None

Command Mode

Global Config

5.4.2.3 **spanning-tree configuration**

This command sets the Configuration Identifier Name for use in identifying the configuration that this switch is currently using. The <name> is a string of at most 32 alphanumeric characters.

Syntax
spanning-tree configuration name <name>
no spanning-tree configuration name

<name> - is a string of at most 32 alphanumeric characters.

no - This command resets the Configuration Identifier Name to its default.

Default Setting

The base MAC address displayed using hexadecimal notation as specified in IEEE 802 standard.

Command Mode

Global Config

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This command sets the Configuration Identifier Revision Level for use in identifying the configuration that this switch is currently using. The Configuration Identifier Revision Level is a number in the range of 0 to 65535.

Syntax

spanning-tree configuration revision <0-65535>

no spanning-tree configuration revision

<value> - Revision Level is a number in the range of 0 to 65535.

no - This command sets the Configuration Identifier Revision Level for use in identifying the configuration that this switch is currently using to the default value, that is, 0.

Default Setting

0

Command Mode

Global Config

5.4.2.4 **spanning-tree mode**

This command sets the Force Protocol Version parameter to a new value. The Force Protocol Version can be one of the following:

1. stp - ST BPDUs are transmitted rather than MST BPDUs (IEEE 802.1d functionality supported)
2. rstp - RST BPDUs are transmitted rather than MST BPDUs (IEEE 802.1w functionality supported)
3. mstp - MST BPDUs are transmitted (IEEE 802.1s functionality supported)

Syntax

spanning-tree mode {stp | rstp | mstp}

no spanning-tree mode

no - This command sets the Force Protocol Version parameter to the default value, that is, mstp.

Default Setting

mstp

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Command Mode

Global Config

5.4.2.5 **spanning-tree forward-time**

This command sets the Bridge Forward Delay parameter to a new value for the common and internal spanning tree. The forward-time value is in seconds within a range of 4 to 30, with the value being greater than or equal to "(Bridge Max Age / 2) + 1".

Syntax
spanning-tree forward-time <4-30> **no spanning-tree forward-time**

<4-30> - forward time value (Range: 4 – 30).

no - This command sets the Bridge Forward Delay parameter for the common and internal spanning tree to the default value, that is, 15.

Default Setting

15

Command Mode

Global Config

5.4.2.6 **spanning-tree hello-time**

This command sets the Hello Time parameter to a new value for the common and internal spanning tree. The hellotime value is in whole seconds within a range of 1 to 10 with the value being less than or equal to "(Bridge Max Age / 2) - 1".

Syntax
spanning-tree hello-time <1-10> **no spanning-tree hello-time**

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<1-10> - hellotime value (Range: 1 – 10).

no - This command sets the Hello Time parameter for the common and internal spanning tree to the default value, that is, 2.

Default Setting

2

Command Mode

Global Config

5.4.2.7 **spanning-tree max-age**

This command sets the Bridge Max Age parameter to a new value for the common and internal spanning tree. The max-age value is in seconds within a range of 6 to 40, with the value being less than or equal to "2 times (Bridge Forward Delay - 1)" and greater than or equal to “2 times (Bridge Hello Time + 1)”.

Syntax
spanning-tree max-age <6-40> **no spanning-tree max-age**

<6-40> - the Bridge Max Age value (Range: 6 – 40).

no - This command sets the Bridge Max Age parameter for the common and internal spanning tree to the default value, that is, 20.

Default Setting

20

Command Mode

Global Config

5.4.2.8 **spanning-tree max-hops**

This command sets the MSTP Max Hops parameter to a new value for the common and internal spanning tree. The max-hops value is in a range of 1 to 127.

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Syntax

spanning-tree max-hops <1-127>

no spanning-tree max-hops

<1-127> - the Maximum hops value (Range: 1-127).

no - This command sets the Bridge Max Hops parameter for the common and internal spanning tree to the default value.

Default Setting

20

Command Mode

Global Config

5.4.2.9 **spanning-tree mst**

This command adds a multiple spanning tree instance to the switch. The instance <1-3965> is a number within a range of 1 to 3965 that corresponds to the new instance ID to be added. The maximum number of multiple instances supported is 4.

Syntax

spanning-tree mst instance <1-4094>

no spanning-tree mst instance <1-4094>

<1-4094> - multiple spanning tree instance ID.

no - This command removes a multiple spanning tree instance from the switch and reallocates all VLANs allocated to the deleted instance to the common and internal spanning tree. The instance <1-4094> is a number that corresponds to the desired existing multiple spanning tree instance to be removed.

Default Setting

None

Command Mode

Global Config

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This command sets the bridge priority for a specific multiple spanning tree instance. The instance <mstid> is a number that corresponds to the desired existing multiple spanning tree instance. The priority value is a number within a range of 0 to 61440 in increments of 4096.

If 0 (defined as the default CIST ID) is passed as the <mstid>, then this command sets the Bridge Priority parameter to a new value for the common and internal spanning tree. The bridge priority value again is a number within a range of 0 to 61440. The twelve least significant bits will be masked according to the 802.1s specification.
This will cause the priority to be rounded down to the next lower valid priority.

Syntax

spanning-tree mst priority <0-4094> <0-61440>

no spanning-tree mst priority <0-4094>

<0-4094> - multiple spanning tree instance ID.

<0-61440> - priority value (Range: 0 – 61440).

no - This command sets the bridge priority for a specific multiple spanning tree instance to the default value, that is, 32768. The instance <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance.

If 0 (defined as the default CIST ID) is passed as the <0-4094>, then this command sets the Bridge Priority parameter for the common and internal spanning tree to the default value, that is, 32768.

Default Setting

32768

Command Mode

Global Config

This command adds an association between a multiple spanning tree instance and a VLAN. The VLAN will no longer be associated with the common and internal spanning tree. The instance <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance. The <1-3965> corresponds to an existing VLAN ID.

Syntax

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spanning-tree mst vlan <0-4094> <1-3965>

no spanning-tree mst vlan <0-4094> <1-3965>

<0-4094> - multiple spanning tree instance ID.

<1-3965> - VLAN ID (Range: 1 – 3965).

no - This command removes an association between a multiple spanning tree instance and a VLAN. The VLAN will again be associated with the common and internal spanning tree. The instance <0-4094> is a number that corresponds to the desired existing multiple spanning tree instance. The <1-3965> corresponds to an existing VLAN ID.

Default Setting

None

Command Mode

Global Config

This command sets the Path Cost or Port Priority for this port within the multiple spanning tree instance or in the common and internal spanning tree. If the <0-4094> parameter corresponds to an existing multiple spanning tree instance, then the configurations are done for that multiple spanning tree instance. If however 0 (defined as the default CIST ID) is passed as the <0-4094>, then the configurations are performed for the common and internal spanning tree instance.

If the ‘cost’ token is specified, this command sets the path cost for this port within a multiple spanning tree instance or the common and internal spanning tree instance, depending on the <0-4094> parameter. The pathcost can be specified as a number in the range of 1 to 200000000 or auto. If "auto" is specified, the pathcost value will be set based on Link Speed.

Syntax

spanning-tree mst <0-4094> cost {<1-200000000> | auto}

no spanning-tree mst <0-4094> cost

<0-4094> - multiple spanning tree instance ID.

no - This command sets the Path Cost or Port Priority for this port within the multiple spanning tree instance or in the common and internal spanning tree to the respective default values. If the <0-4094> parameter corresponds to an existing multiple spanning tree instance, then the configurations are done for that multiple spanning tree instance. If however, 0 (defined as the default CIST ID) is passed as the <0-4094>, then the configurations are performed for the common and internal spanning tree instance.

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If the ‘cost’ token is specified, this command sets the path cost for this port within a multiple spanning tree instance or the common and internal spanning tree instance, depending on the <0-4094> parameter, to the default value, that is, a pathcost value based on the Link Speed.

Default Setting

Cost : auto

Command Mode

Interface Config

This command sets the Path Cost or Port Priority for this port within the multiple spanning tree instance or in the common and internal spanning tree. If the <0-4094> parameter corresponds to an existing multiple spanning tree instance, then the configurations are done for that multiple spanning tree instance. If however 0 (defined as the default CIST ID) is passed as the <0-4094>, then the configurations are performed for the common and internal spanning tree instance.

If the ‘port-priority’ token is specified, this command sets the priority for this port within a specific multiple spanning tree instance or the common and internal spanning tree instance, depending on the <0-4094> parameter. The port-priority value is a number in the range of 0 to 240 in increments of 16.

Syntax
spanning-tree mst <0-4094> port-priority <0-240> **no spanning-tree mst <0-4094> port-priority**

<0-4094> - multiple spanning tree instance ID.

no - This command sets the Path Cost or Port Priority for this port within the multiple spanning tree instance or in the common and internal spanning tree to the respective default values. If the <0-4094> parameter corresponds to an existing multiple spanning tree instance, then the configurations are done for that multiple spanning tree instance. If however, 0 (defined as the default CIST ID) is passed as the <0-4094>, then the configurations are performed for the common and internal spanning tree instance.

If the ‘port-priority’ token is specified, this command sets the priority for this port within a specific multiple spanning tree instance or the common and internal spanning tree instance, depending on the <0-4094> parameter, to the default value, that is, 128.

Default Setting

port-priorty : 128

Command Mode

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Interface Config

5.4.2.10 **spanning-tree port mode**

This command sets the Administrative Switch Port State for this port to enabled.

Syntax
spanning-tree port mode
no spanning-tree port mode

no - This command sets the Administrative Switch Port State for this port to disabled.

Default Setting

Disabled

Command Mode

Interface Config

This command sets the Administrative Switch Port State for all ports to enabled.

Syntax
spanning-tree port mode all
no spanning-tree port mode all

all - All interfaces.

no - This command sets the Administrative Switch Port State for all ports to disabled.

Default Setting

Disabled

Command Mode

Global Config

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5.4.2.11 **spanning-tree edgeport**

This command specifies that this port is an Edge Port within the common and internal spanning tree. This will allow this port to transition to Forwarding State without delay.

Syntax
spanning-tree edgeport **no spanning-tree edgeport**

no - This command specifies that this port is not an Edge Port within the common and internal spanning tree.

Default Setting

None

Command Mode

Interface Config

5.5 System Log Management Commands

5.5.1 **Show Commands**

5.5.1.1 **show logging**

This command displays logging.

Syntax
show logging

Default Setting

None

Command Mode

Privileged Exec

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Display Message

Logging Client Local Port The port on the collector/relay to which syslog messages are sent
CLI Command Logging The mode for CLI command logging.
Console Logging The mode for console logging.
Console Logging Severity Filter The minimum severity to log to the console log. Messages with an equal or lower numerical severity are logged.
Buffered Logging The mode for buffered logging.
Syslog Logging The mode for logging to configured syslog hosts. If set to disable logging stops to all syslog hosts.
Log Messages Received The number of messages received by the log process. This includes messages that are dropped or ignored
Log Messages Dropped The number of messages that could not be processed.
Log Messages Relayed The number of messages that are relayed.
Log Messages Ignored The number of messages that are ignored.

5.5.2 **show logging buffered**

This command displays the message log maintained by the switch. The message log contains system trace information.

Syntax
show logging buffered

Default Setting

None

Command Mode

Privileged Exec

Display Message

Message: The message that has been logged.

Note: Message log information is not retained across a switch reset.

5.5.3 **show logging traplog**

This command displays the trap log maintained by the switch.
The trap log contains a maximum of 256 entries that wrap.

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Syntax
show logging traplogs

Default Setting

None

Command Mode

Privileged Exec

Display Message

Number of Traps since last reset: The number of traps that have occurred since the last reset of this device.
Trap Log Capacity: The maximum number of traps that could be stored in the switch.
Log: The sequence number of this trap.
System Up Time: The relative time since the last reboot of the switch at which this trap occurred.
Trap: The relevant information of this trap.

Note: *Trap log information is not retained across a switch reset.*

5.5.3.1 show logging hosts

This command displays all configured logging hosts.

Syntax
show logging hosts

Default Setting

None

Command Mode

Privileged Exec

Display Message

Index (used for deleting)
IP Address IP Address of the configured server.
Severity The minimum severity to log to the specified address.
Port Server Port Number.This is the port on the local host from which syslog messages are sent.
Status The state of logging to configured syslog hosts. If the status is disable, no logging occurs.

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5.5.4 Configuration Commands

5.5.4.1 logging buffered

This command enables logging to in-memory log where up to 128 logs are kept.

Syntax
logging buffered
no logging buffered

no - This command disables logging to in-memory log.

Default Setting

None

Command Mode

Privileged Exec

This command enables wrapping of in-memory logging when full capacity reached. Otherwise when full capacity is reached, logging stops.

Syntax
logging buffered wrap
no logging buffered wrap

no - This command disables wrapping of in-memory logging when full capacity reached.

Default Setting

None

Command Mode

Privileged Exec

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5.5.4.2 **logging console**

This command enables logging to the console.

Syntax
logging console [<severitylevel> | <0-7>] **no logging console**

[<severitylevel> | <0-7>] - The value is specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

no - This command disables logging to the console.

Default Setting

None

Command Mode

Privileged Exec

5.5.4.3 **logging host**

This command enables logging to a host where up to eight hosts can be configured.

Syntax
logging host <hostaddress> [<port>] [[<severitylevel> | <0-7>]]

<hostaddress> - IP address of the log server.

<port> - Port number.

[<severitylevel> | <0-7>] - The value is specified as either an integer from 0 to 7 or symbolically through one of the following keywords: emergency (0), alert (1), critical (2), error (3), warning (4), notice (5), informational (6), debug (7).

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Default Setting

None

Command Mode

Privileged Exec

This command disables logging to hosts.

Syntax
logging host remove <hostindex>

< hostindex > - Index of the log server.

Default Setting

None

Command Mode

Privileged Exec

This command reconfigures the IP address of the log server.

Syntax
logging host reconfigure <hostindex> <hostaddress>

< hostindex > - Index of the log server.

<hostaddress> - New IP address of the log server.

Default Setting

None

Command Mode

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Privileged Exec

5.5.4.4 **logging syslog**

This command enables syslog logging.

Syntax
logging syslog **no logging syslog**

no - Disables syslog logging.

Default Setting

None

Command Mode

Privileged Exec

This command sets the local port number of the LOG client for logging messages.
.

Syntax
logging syslog port <portid> **no logging syslog port**

no - Resets the local logging port to the default.

Default Setting

None

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Command Mode

Privileged Exec

5.5.4.5 **clear logging buffered**

This command clears all in-memory log.

Syntax
clear logging buffered

Default Setting

None

Command Mode

Privileged Exec

5.6 Script Management Commands

5.6.1 **script apply**

This command applies the commands in the configuration script to the switch. The apply command backs up the running configuration and then starts applying the commands in the script file. Application of the commands stops at the first failure of a command.

Syntax
script apply <scriptname>

<scriptname> - The name of the script to be applied.

Default Setting

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None

Command Mode

Privileged Exec

5.6.2 **script delete**

This command deletes a specified script or all the scripts presented in the switch.

Syntax
script delete {<scriptname> | all}

<scriptname> - The name of the script to be deleted.

all - Delete all scripts presented in the switch

Default Setting

None

Command Mode

Privileged Exec

5.6.3 **script list**

This command lists all scripts present on the switch as well as the total number of files present.

Syntax
script list

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Default Setting

None

Command Mode

Privileged Exec

5.6.4 **script show**

This command displays the content of a script file.

Syntax
script show <scriptname>

<scriptname> - Name of the script file.

Default Setting

None

Command Mode

Privileged Exec

5.7 User Account Management Commands

5.7.1 **Show Commands**

5.7.1.1 **show users**

This command displays the configured user names and their settings. This command is only available for users with readwrite privileges. The SNMPv3 fields will only be displayed if SNMP is available on the system.

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Syntax
show users

Default Setting

None

Command Mode

Privileged Exec

Display Message

User Name: The name the user will use to login using the serial port, Telnet or Web. A new user may be added to the switch by entering a name in a blank entry. The user name may be up to eight characters, and is not case sensitive. Two users are included as the factory default, admin, and guest.
User Access Mode: Shows whether the operator is able to change parameters on the switch (Read/Write) or is only able to view them (Read Only). As a factory default, admin has Read/Write access and guest has Read Only access. There can only be one Read/Write user and up to five Read Only users.
SNMPv3 AccessMode: This field displays the SNMPv3 Access Mode. If the value is set to **Read- Write,** the SNMPv3 user will be able to set and retrieve parameters on the system. If the value is set to **ReadOnly,** the SNMPv3 user will only be able to retrieve parameter information. The SNMPv3 access mode may be different from the CLI and Web access mode.
SNMPv3 Authentication: This field displays the authentication protocol to be used for the specified login user.
SNMPv3 Encryption: This field displays the encryption protocol to be used for the specified login user.

5.7.2 Configuration Commands

5.7.2.1 username

This command adds a new user (account) if space permits. The account <username> can be up to eight characters in length. The name may be comprised of alphanumeric characters as well as the dash ('-') and underscore ('_'). The <username> is not case-sensitive. Six user names can be defined.

This command changes the password of an existing operator. User password should not be more than eight characters in length. If a user is authorized for authentication or encryption is enabled, the password must be eight alphanumeric characters in length. The username and password are not case-sensitive. When a password is changed, a prompt will ask for the operator's former password. If none, press enter.

Syntax
username <username> {password | nopassword}

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no username <username>

<username> - is a new user name (Range: up to 8 characters).

no - This command removes a user name created before.
Note: The admin user account cannot be deleted.

nopassword - This command sets the password of an existing operator to blank. When a password is changed, a prompt will ask for the operator's former password. If none, press enter.

Default Setting

No password

Command Mode

Global Config

5.7.2.2 **username snmpv3 authentication**

This command specifies the authentication protocol to be used for the specified login user. The valid authentication protocols are **none**, **md5** or **sha**. If **md5** or **sha** are specified, the user login password will be used as the snmpv3 authentication password. The <username> is the login user name for which the specified authentication protocol will be used.

Syntax
username snmpv3 authentication <username> {none | md5 | sha}
no username snmpv3 authentication <username>

<username> - is the login user name.

md5 - md5 authentication method.

sha - sha authentication method.

none - no use authentication method.

no - This command sets the authentication protocol to be used for the specified login user to **none**. The <username> is the login user name for which the specified authentication protocol will be used.

Default Setting

No authentication

Command Mode

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Global Config

5.7.2.3 **username snmpv3 encryption**

This command specifies the encryption protocol and key to be used for the specified login user. The valid encryption protocols are **none** or **des**. The **des** protocol requires a **key**, which can be specified on the command line. The **key** may be up to 16 characters. If the **des** protocol is specified but a key is not provided, the user will be prompted to enter the key. If **none** is specified, a key must not be provided. The <username> is the login user name for which the specified encryption protocol will be used.

Syntax
username snmpv3 encryption <username> {none | des [<key>]} **no username snmpv3 encryption <username>**

<username> - is the login user name.

des - des encryption protocol.

none - no encryption protocol.

no - This command sets the encryption protocol to **none**. The <username> is the login user name for which the specified encryption protocol will be used.

Default Setting

No encryption

Command Mode

Global Config

5.8 Security Commands

5.8.1 **Show Commands**

5.8.1.1 **show users authentication**

This command displays all users and all authentication login information. It also displays the authentication login list assigned to the default user.

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Syntax
show users authentication

Default Setting

None

Command Mode

Privileged Exec

Display Message

User: This field lists every user that has an authentication login list assigned.
System Login: This field displays the authentication login list assigned to the user for system login.
802.1x: This field displays the authentication login list assigned to the user for 802.1x port security.

5.8.1.2 **show authentication**

This command displays the ordered authentication methods for all authentication login lists.

Syntax
show authentication

Default Setting

None

Command Mode

Privileged Exec

Display Message

Authentication Login List: This displays the authentication login listname.
Method 1: This displays the first method in the specified authentication login list, if any.
Method 2: This displays the second method in the specified authentication login list, if any.
Method 3: This displays the third method in the specified authentication login list, if any.

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5.8.1.3 **show authentication users**

This command displays information about the users assigned to the specified authentication login list. If the login is assigned to non-configured users, the user “default” will appear in the user column.

Syntax
show authentication users <listname>

<listname> - the authentication login listname.

Default Setting

None

Command Mode

Privileged Exec

Display Message

User Name: This field displays the user assigned to the specified authentication login list.
Component: This field displays the component (User or 802.1x) for which the authentication login list is assigned.

5.8.1.4 **show dot1x**

This command is used to show the status of the dot1x Administrative mode.

Syntax
show dot1x

Default Setting

None

Command Mode

Privileged Exec

Display Message

Administrative mode: Indicates whether authentication control on the switch is enabled or disabled.

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5.8.1.5 **show dot1x detail**

This command is used to show a summary of the global dot1x configuration and the detailed dot1x configuration for a specified port.

Syntax
show dot1x detail <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port: The interface whose configuration is displayed
Protocol Version: The protocol version associated with this port. The only possible value is 1, corresponding to the first version of the dot1x specification.
PAE Capabilities: The port access entity (PAE) functionality of this port. Possible values are Authenticator or Supplicant.
Authenticator PAE State: Current state of the authenticator PAE state machine. Possible values are Initialize, Disconnected, Connecting, Authenticating, Authenticated, Aborting, Held, ForceAuthorized, and ForceUnauthorized.
Backend Authentication State: Current state of the backend authentication state machine. Possible values are Request, Response, Success, Fail, Timeout, Idle, and Initialize.
Quiet Period: The timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The value is expressed in seconds and will be in the range of 0 to 65535.
Transmit Period: The timer used by the authenticator state machine on the specified port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The value is expressed in seconds and will be in the range of 1 to 65535.
Supplicant Timeout: The timer used by the authenticator state machine on this port to timeout the supplicant. The value is expressed in seconds and will be in the range of 1 to 65535.
Server Timeout: The timer used by the authenticator on this port to timeout the authentication server. The value is expressed in seconds and will be in the range of 1 to 65535.
Maximum Requests: The maximum number of times the authenticator state machine on this port will retransmit an EAPOL EAP Request/Identity before timing out the supplicant. The value will be in the range of 1 to 10.
Reauthentication Period: The timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The value is expressed in seconds and will be in the range of 1 to 65535.
Reauthentication Enabled: Indicates if reauthentication is enabled on this port. Possible values are True or False.
Key Transmission Enabled: Indicates if the key is transmitted to the supplicant for the specified port. Possible values are True or False.
Control Direction: Indicates the control direction for the specified port or ports. Possible values are both or in.

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5.8.1.6 **show dot1x statistics**

This command is used to show a summary of the global dot1x configuration and the dot1x statistics for a specified port.

Syntax
show dot1x statistics <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port: The interface whose statistics are displayed.
EAPOL Frames Received: The number of valid EAPOL frames of any type that have been received by this authenticator.
EAPOL Frames Transmitted: The number of EAPOL frames of any type that have been transmitted by this authenticator.
EAPOL Start Frames Received: The number of EAPOL start frames that have been received by this authenticator.
EAPOL Logoff Frames Received: The number of EAPOL logoff frames that have been received by this authenticator.
Last EAPOL Frame Version: The protocol version number carried in the most recently received EAPOL frame.
Last EAPOL Frame Source: The source MAC address carried in the most recently received EAPOL frame.
EAP Response/Id Frames Received: The number of EAP response/identity frames that have been received by this authenticator.
EAP Response Frames Received: The number of valid EAP response frames (other than resp/id frames) that have been received by this authenticator.
EAP Request/Id Frames Transmitted: The number of EAP request/identity frames that have been transmitted by this authenticator.
EAP Request Frames Transmitted: The number of EAP request frames (other than request/identity frames) that have been transmitted by this authenticator.
Invalid EAPOL Frames Received: The number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.
EAP Length Error Frames Received: The number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.

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5.8.1.7 **show dot1x summary**

This command is used to show a summary of the global dot1x configuration and summary information of the dot1x configuration for a specified port or all ports.

Syntax
show dot1x summary {<slot/port> | all}

<slot/port> - is the desired interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: The interface whose configuration is displayed.
Control Mode: The configured control mode for this port. Possible values are force-unauthorized / force-authorized / auto.
Operating Control Mode: The control mode under which this port is operating. Possible values are authorized / unauthorized.
Reauthentication Enabled: Indicates whether re-authentication is enabled on this port.
Port Status: Indicates if the key is transmitted to the supplicant for the specified port.

5.8.1.8 **show dot1x users**

This command displays 802.1x port security user information for locally configured users.

Syntax
show dot1x users <slot/port>

<slot/port> - is the desired interface number.

Default Setting

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None

Command Mode

Privileged Exec

Display Message

User: Users configured locally to have access to the specified port.

5.8.1.9 **show radius-servers**

This command is used to display items of the configured RADIUS servers.

Syntax
show radius-servers

Default Setting

None

Command Mode

Privileged Exec

Display Message

IP Address: IP Address of the configured RADIUS server
Port: The port in use by this server
Type: Primary or secondary
Secret Configured: Yes / No
Message Authenticator: The message authenticator attribute configured for the radius server.

5.8.1.10 **show radius**

This command is used to display the various RADIUS configuration items for the switch.

Syntax
show radius

Default Setting

None

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Command Mode

Privileged Exec

Display Message

Current Server IP Address: Indicates the configured server currently in use for authentication
Number of configured servers: The configured IP address of the authentication server
Number of retransmits: The configured value of the maximum number of times a request packet is retransmitted
Timeout Duration: The configured timeout value, in seconds, for request re-transmissions
RADIUS Accounting Mode: Disable or Enabled

5.8.1.11 **show radius accounting**

This command is used to display the configured RADIUS accounting mode, accounting server, and the statistics for the configured accounting server.

Syntax
show radius accounting [statistics <ipaddr>]

<ipaddr> - is an IP Address.

Default Setting

None

Command Mode

Privileged Exec

Display Message

If the optional token 'statistics <ipaddr>' is not included, then only the accounting mode and the RADIUS accounting server details are displayed.

RADIUS Accounting Mode: Enabled or disabled
IP Address: The configured IP address of the RADIUS accounting server
Port: The port in use by the RADIUS accounting server
Secret Configured: Yes or No

If the optional token 'statistics <ipaddr>' is included, the statistics for the configured RADIUS accounting server are displayed. The IP address parameter must match that of a previously configured RADIUS accounting server. The following information regarding the statistics of the RADIUS accounting server is displayed.

RADIUS Accounting Server IP Address: IP Address of the configured RADIUS accounting server
Round Trip Time: The time interval in centiseconds, between the most recent Accounting- Response and the Accounting-Request that matched it from the RADIUS accounting server.

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Requests: The number of RADIUS Accounting-Request packets sent to this accounting server. This number does not include retransmissions.
Retransmission: The number of RADIUS Accounting-Request packets retransmitted to this RADIUS accounting server.
Responses: The number of RADIUS packets received on the accounting port from this server.
Malformed Responses: The number of malformed RADIUS Accounting-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators and unknown types are not included as malformed accounting responses.
Bad Authenticators: The number of RADIUS Accounting-Response packets containing invalid authenticators received from this accounting server.
Pending Requests: The number of RADIUS Accounting-Request packets sent to this server that have not yet timed out or received a response.
Timeouts: The number of accounting timeouts to this server.
Unknown Types: The number of RADIUS packets of unknown types, which were received from this server on the accounting port.
Packets Dropped: The number of RADIUS packets received from this server on the accounting port and dropped for some other reason.

5.8.1.12 **show radius statistics**

This command is used to display the statistics for RADIUS or configured server. To show the configured RADIUS server statistic, the IP Address specified must match that of a previously configured RADIUS server. On execution, the following fields are displayed.

Syntax
show radius statistics [<ipaddr>]

<ipaddr> - is an IP Address.

Default Setting

None

Command Mode

Privileged Exec

Display Message

If an IP address is not specified then only the Invalid Server Addresses field is displayed. Otherwise, the other listed fields are displayed.

Invalid Server Addresses: The number of RADIUS Access-Response packets received from unknown addresses.
Server IP Address: The IP address of radius server.
Round Trip Time: The time interval, in hundredths of a second, between the most recent Access-Reply/ Access-Challenge and the Access-Request that matched it from the RADIUS authentication server.

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Access Requests: The number of RADIUS Access-Request packets sent to this server. This number does not include retransmissions.
Access Retransmission: The number of RADIUS Access-Request packets retransmitted to this RADIUS authentication server.
Access Accepts: The number of RADIUS Access-Accept packets, including both valid and invalid packets, which were received from this server.
Access Rejects: The number of RADIUS Access-Reject packets, including both valid and invalid packets, which were received from this server.
Access Challenges: The number of RADIUS Access-Challenge packets, including both valid and invalid packets, which were received from this server.
Malformed Access Responses: The number of malformed RADIUS Access-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators or signature attributes or unknown types are not included as malformed access responses.
Bad Authenticators: The number of RADIUS Access-Response packets containing invalid authenticators or signature attributes received from this server.
Pending Requests: The number of RADIUS Access-Request packets destined for this server that have not yet timed out or received a response.
Timeouts: The number of authentication timeouts to this server.
Unknown Types: The number of RADIUS packets of unknown types, which were received from this server on the authentication port.
Packets Dropped: The number of RADIUS packets received from this server on the authentication port and dropped for some other reason.

5.8.1.13 **show tacacs**

This command display configured information of the TACACS.

Syntax
show tacacs

Default Setting

None

Command Mode

Privileged Exec

Display Message

Admin Mode: Displays TACACS administration mode.

Server 1 Port: TACACS packet port number

Server 1 Key: Secret Key between TACACS server and client

Server 1 IP: First TACACS Server IP address

Server 1 Timeout (sec): Timeout value in seconds while TACACS server has no response

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Server 1 Retry: Retry count if TACACS server has no response

Server 1 Mode: Current TACACS server admin mode (disable, master or slave)

Server 2 Port: TACACS packet port number

Server 2 Key: Secret Key between TACACS server and client

Server 2 IP: Second TACACS Server IP address

Server 2 Timeout (sec): Timeout value in seconds while TACACS server has no response

Server 2 Retry: Retry count if TACACS server has no response

Server 2 Mode: Current TACACS server admin mode (disable, master or slave)

Server 3 Port: TACACS packet port number

Server 3 Key: Secret Key between TACACS server and client

Server 3 IP: Third TACACS Server IP address

Server 3 Timeout (sec): Timeout value in seconds while TACACS server has no response

Server 3 Retry: Retry count if TACACS server has no response

Server 3 Mode: Current TACACS server admin mode (disable, master or slave)

5.8.1.14 **show port-security**

This command shows the port-security settings for the entire system.

Syntax
show port-security

Default Setting

None

Command Mode

Privileged Exec

Display Message

Port Security Administration Mode: Port lock mode for the entire system.

This command shows the port-security settings for a particular interface or all interfaces.

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Syntax

show port-security { <slot/port> | all }

Default Setting

None

Command Mode

Privileged Exec

Display Message

Intf Interface Number.
Interface Admin Mode Port Locking mode for the Interface.
Dynamic Limit Maximum dynamically allocated MAC Addresses.
Static Limit Maximum statically allocated MAC Addresses.
Violation Trap Mode Whether violation traps are enabled.

This command shows the dynamically locked MAC addresses for port.

Syntax

show port-security dynamic <slot/port>

Default Setting

None

Command Mode

Privileged Exec

Display Message

MAC address Dynamically locked MAC address.

This command shows the statically locked MAC addresses for port.

Syntax

show port-security static <slot/port>

Default Setting

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None

Command Mode

Privileged Exec

Display Message

MAC address Statically locked MAC address.

This command displays the source MAC address of the last packet that was discarded on a locked port.

Syntax
show port-security violation <slot/port>

Default Setting

None

Command Mode

Privileged Exec

Display Message

MAC address MAC address of discarded packet on locked ports.

5.8.2 Configuration Commands

5.8.2.1 authentication login

This command creates an authentication login list. The **<listname>** is up to 15 alphanumeric characters and is not case sensitive. Up to 10 authentication login lists can be configured on the switch. When a list is created, the authentication method “local” is set as the first method.

When the optional parameters “method1”, “method 2”, and/or “method 3” are used, an ordered list of methods are set in the authentication login list. If the authentication login list does not exist, a new authentication login list is first created and then the authentication methods are set in the authentication login list. The maximum number of authentication login methods is three. **The possible method values are local, radius, reject, and tacacs.**

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The value of **local** indicates that the user's locally stored ID and password are used for authentication. The value of **radius** indicates that the user's ID and password will be authenticated using the RADIUS server. The value of **reject** indicates that the user is never authenticated. The value of **tacacs** indicates that the user's ID and password will be authenticated using the TACACS.

To authenticate a user, the authentication methods in the user's login will be attempted in order until an authentication attempt succeeds or fails.

Note that the default login list included with the default configuration cannot be changed.

Syntax
authentication login <listname> [<method1>] [<method2>] [<method3>] **no authentication login <listname>**

<listname> - creates an authentication login list (Range: up to 15 characters).

<method1 - 3> - The possible method values are local, radius, reject, and tacacs.

no - This command deletes the specified authentication login list. The attempt to delete will fail if any of the following conditions are true:

1. The login list name is invalid or does not match an existing authentication login list
2. The specified authentication login list is assigned to any user or to the nonconfigured user for any component.
3. The login list is the default login list included with the default configuration and was not created using 'config authentication login create'. The default login list cannot be deleted.

Default Setting

None

Command Mode

Global Config

5.8.2.2 **username defaultlogin**

This command assigns the authentication login list to use for non-configured users when attempting to log in to the system. This setting is overridden by the authentication login list assigned to a specific user if the user is configured locally. If this value is not configured, users will be authenticated using local authentication only.

Syntax
username defaultlogin <listname>

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<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

5.8.2.3 **username login**

This command assigns the specified authentication login list to the specified user for system login. The <**username>** must be a configured <**username>** and the <**listname>** must be a configured login list.

If the user is assigned a login list that requires remote authentication, all access to the interface from all CLI, web, and telnet sessions will be blocked until the authentication is complete.

Note that the login list associated with the 'admin' user cannot be changed to prevent accidental lockout from the switch.

Syntax
username login <user> <listname>

<user> - is the login user name.

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

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5.8.3 Dot1x Configuration Commands

5.8.3.1 dot1x initialize

This command begins the initialization sequence on the specified port. This command is only valid if the control mode for the specified port is 'auto'. If the control mode is not 'auto' an error will be returned.

Syntax
dot1x initialize <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

5.8.3.2 dot1x default-login

This command assigns the authentication login list to use for non-configured users for 802.1x port security. This setting is over-ridden by the authentication login list assigned to a specific user if the user is configured locally. If this value is not configured, users will be authenticated using local authentication only.

Syntax
dot1x defaultl-login <listname>

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

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5.8.3.3 **dot1x login**

This command assigns the specified authentication login list to the specified user for 802.1x port security. The <user> parameter must be a configured user and the <listname> parameter must be a configured authentication login list.

Syntax
dot1x login <user> <listname>

<user> - is the login user name.

<listname> - an authentication login list.

Default Setting

None

Command Mode

Global Config

5.8.3.4 **dot1x system-auth-control**

This command is used to enable the dot1x authentication support on the switch. By default, the authentication support is disabled. While disabled, the dot1x configuration is retained and can be changed, but is not activated.

Syntax
dot1x system-auth-control
no dot1x system-auth-control

no - This command is used to disable the dot1x authentication support on the switch.

Default Setting

Disabled

Command Mode

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Global Config

5.8.3.5 **dot1x user**

This command adds the specified user to the list of users with access to the specified port or all ports. The <username> parameter must be a configured user.

Syntax
dot1x user <user> {<slot/port> | all} **no dot1x user <user> {<slot/port> | all}**

<user> - Is the login user name.

<slot/port> - Is the desired interface number.

all - All interfaces.

no - This command removes the user from the list of users with access to the specified port or all ports.

Default Setting

None

Command Mode

Global Config

5.8.3.6 **dot1x port-control**

This command sets the authentication mode to be used on all ports. The control mode may be one of the following.
force-unauthorized: The authenticator PAE unconditionally sets the controlled port to unauthorized.
force-authorized: The authenticator PAE unconditionally sets the controlled port to authorized.
auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Syntax

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dot1x port-control all {auto | force-authorized | force-unauthorized}

no dot1x port-control all

all - All interfaces.

no - This command sets the authentication mode to be used on all ports to 'auto'.

Default Setting

auto

Command Mode

Global Config

This command sets the authentication mode to be used on the specified port. The control mode may be one of the following.

force-unauthorized: The authenticator PAE unconditionally sets the controlled port to unauthorized.
force-authorized: The authenticator PAE unconditionally sets the controlled port to authorized.

auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Syntax

dot1x port-control {auto | force-authorized | force-unauthorized}

no dot1x port-control

no - This command sets the authentication mode to be used on the specified port to 'auto'.

Default Setting

auto

Command Mode

Interface Config

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5.8.3.7 **dot1x max-req**

This command sets the maximum number of times the authenticator state machine on this port will transmit an EAPOL EAP Request/Identity frame before timing out the supplicant. The <1-10> value must be in the range 1 - 10.

Syntax
dot1x max-req <1-10> **no dot1x max-req**

<1-10> - maximum number of times (Range: 1 – 10).

no - This command sets the maximum number of times the authenticator state machine on this port will transmit an EAPOL EAP Request/Identity frame before timing out the supplicant to the default value, that is, 2.

Default Setting

2

Command Mode

Interface Config

5.8.3.8 **dot1x re-authentication**

This command enables re-authentication of the supplicant for the specified port.

Syntax
dot1x re-authentication **no dot1x re-authentication**

no - This command disables re-authentication of the supplicant for the specified port.

Default Setting

Disabled

Command Mode

Interface Config

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5.8.3.9 **dot1x re-reauthenticate**

This command begins the re-authentication sequence on the specified port. This command is only valid if the control mode for the specified port is 'auto'. If the control mode is not 'auto' an error will be returned.

Syntax
dot1x re-authenticate <slot/port>

<slot/port> - is the desired interface number.

Default Setting

None

Command Mode

Privileged Exec

5.8.3.10 **dot1x timeout**

This command sets the value, in seconds, of the timer used by the authenticator state machine on this port. Depending on the token used and the value (in seconds) passed; various timeout configurable parameters are set. The following tokens are supported.

reauth-period: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to determine when re-authentication of the supplicant takes place. The reauth-period must be a value in the range 1 - 65535.

quiet-period: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The quiet-period must be a value in the range 0 - 65535.

tx-period: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The quiet-period must be a value in the range 1 - 65535.

supp-timeout: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the supplicant. The supp-timeout must be a value in the range 1 - 65535.

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server-timeout: Sets the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the authentication server. The supp-timeout must be a value in the range 1 - 65535.

Syntax
dot1x timeout {quiet-period | reauth-period | server-timeout | supp-timeout | tx-period} <seconds> **no dot1x timeout {quiet-period | reauth-period | server-timeout | supp-timeout | tx-period}**

<seconds> - Value in the range 0 – 65535.

no - This command sets the value, in seconds, of the timer used by the authenticator state machine on this port to the default values. Depending on the token used, the corresponding default values are set.

Default Setting

reauth-period: 3600 seconds

quiet-period: 60 seconds

tx-period: 30 seconds
supp-timeout: 30 seconds
server-timeout: 30 seconds

Command Mode

Interface Config

5.8.4 **Radius Configuration Commands**

5.8.4.1 **radius accounting mode**

This command is used to enable the RADIUS accounting function.

Syntax
radius accounting mode **no radius accounting mode**

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no - This command is used to set the RADIUS accounting function to the default value - that is, the RADIUS accounting function is disabled.

Default Setting

Disabled

Command Mode

Global Config

5.8.4.2 **radius-server host**

This command is used to configure the RADIUS authentication and accounting server. If the **'auth'** token is used, the command configures the IP address to use to connect to a RADIUS authentication server. Up to 3 servers can be configured per RADIUS client. If the maximum number of configured servers is reached, the command will fail until one of the servers is removed by executing the **no** form of the command. If the optional **<port>** parameter is used, the command will configure the UDP port number to use to connect to the configured RADIUS server. In order to configure the UDP port number, the IP address must match that of a previously configured RADIUS authentication server. The port number must lie between 1 - 65535, with 1812 being the default value.

If the **'acct'** token is used, the command configures the IP address to use for the RADIUS accounting server. Only a single accounting server can be configured. If an accounting server is currently configured, it must be removed from the configuration using the no form of the command before this command succeeds. If the optional **<port>** parameter is used, the command will configure the UDP port to use to connect to the RADIUS accounting server. The IP address specified must match that of a previously configured accounting server. If a port is already configured for the accounting server then the new port will replace the previously configured value. The port must be a value in the range 1 - 65535, with 1813 being the default value.

Syntax
radius-server host {acct | auth} <ipaddr> [port] **no radius-server host {acct | auth} <ipaddr>**

<ipaddr> - is a IP address.

[port] - Port number (Range: 1 – 65535)

no - This command is used to remove the configured RADIUS authentication server or the RADIUS accounting server. If the 'auth' token is used, the previously configured RADIUS authentication server is removed from the configuration. Similarly, if the 'acct' token is used, the previously configured RADIUS accounting server is removed from the configuration. The <ipaddr> parameter must match the IP address of the previously configured RADIUS authentication / accounting server.

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Default Setting

None

Command Mode

Global Config

5.8.4.3 **radius-sever key**

This command is used to configure the shared secret between the RADIUS client and the RADIUS accounting / authentication server. Depending on whether the **'auth'** or **'acct'** token is used, the shared secret will be configured for the RADIUS authentication or RADIUS accounting server. The IP address provided must match a previously configured server. When this command is executed, the secret will be prompted. The secret must be an alphanumeric value not exceeding 20 characters.

Syntax
radius-server key {acct | auth} <ipaddr>

<ipaddr> - is a IP address.

Default Setting

None

Command Mode

Global Config

5.8.4.4 **radius-server retransmit**

This command sets the maximum number of times a request packet is re-transmitted when no response is received from the RADIUS server. The retries value is an integer in the range of 1 to 15.

Syntax
radius-server retransmit <retries>

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no radius-server retransmit

<retries> - the maximum number of times (Range: 1 - 15).

no - This command sets the maximum number of times a request packet is re-transmitted, when no response is received from the RADIUS server, to the default value, that is, 10.

Default Setting

10

Command Mode

Global Config

5.8.4.5 **radius-server timeout**

This command sets the timeout value (in seconds) after which a request must be retransmitted to the RADIUS server if no response is received. The timeout value is an integer in the range of 1 to 30.

Syntax
radius-server timeout <seconds>
no radius-server timeout

<seconds> - the maximum timeout (Range: 1 - 30).

no - This command sets the timeout value (in seconds) after which a request must be retransmitted to the RADIUS server if no response is received, to the default value, that is, 6.

Default Setting

6

Command Mode

Global Config

5.8.4.6 **radius-server msgauth**

This command enables the message authenticator attribute for a specified server.

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Syntax
radius-server msgauth <ipaddr>

<ipaddr> - is a IP address.

Default Setting

None

Command Mode

Global Config

5.8.4.7 **radius-server primary**

This command is used to configure the primary RADIUS authentication server for this RADIUS client. The primary server is the one that is used by default for handling RADIUS requests. The remaining configured servers are only used if the primary server cannot be reached. A maximum of three servers can be configured on each client. Only one of these servers can be configured as the primary. If a primary server is already configured prior to this command being executed, the server specified by the IP address specified used in this command will become the new primary server. The IP address must match that of a previously configured RADIUS authentication server.

Syntax
radius-server primary <ipaddr>

<ipaddr> - is a IP address.

Default Setting

None

Command Mode

Global Config

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5.8.5 **TACACS Configuration Commands**

5.8.5.1 **tacacs**

This command is used to enable /disable the TACACS function.

Syntax
tacacs **no tacacs**

no - This command is used to disable the TACACS function.

Default Setting

Disabled

Command Mode

Global Config

5.8.5.2 **tacacs mode**

This command is used to enable/select/disable the TACACS server administrative mode

Syntax
tacacs mode <1-3> {master | slave} **no tacacs mode <1-3>**

<1-3> - The valid value of index is 1, 2, and 3.

no - This command is used to disable it.

Default Setting

Disabled

Command Mode

Global Config

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5.8.5.3 **tacacs server-ip**

This command is used to configure the TACACS server IP address.

Syntax
tacacs server-ip <1-3> <ipaddr> **no tacacs server-ip <1-3>**

<ipaddr> - An IP address.

<1-3> - The valid value of index is 1, 2, and 3.

no - This command is used to remove the TACACS server IP address.

Default Setting

IP 0.0.0.0

Command Mode

Global Config

5.8.5.4 **tacacs port**

This command is used to configure the TACACS server's service port.

Syntax
tacacs port <1-3> <1-65535> **no tacacs port <1-3>**

<1-65535> - service port (Range: 1 to 65535).

<1-3> - The valid value of index is 1, 2, and 3.

no - This command is used to reset port-id to the default value.

Default Setting

49

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Command Mode

Global Config

5.8.5.5 **tacacs key**

This command is used to configure the TACACS server shared secret key.

Syntax
tacacs key <1-3> **no tacacs key <1-3>**

Note that the length of the secret key is up to 32 characters.

<1-3> - The valid value of index is 1, 2, and 3.

no - This command is used to remove the TACACS server secret key.

Default Setting

None

Command Mode

Global Config

5.8.5.6 **tacacs retry**

This command is used to configure the TACACS packet retransmit times.

Syntax
tacacs retry <1-3> <1-9> **no tacacs retry <1-3>**

<1-9> - retry times (Range: 1 to 9).

<1-3> - The valid value of index is 1, 2, and 3.

no - This command is used to reset retry value to the default value.

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Default Setting

5

Command Mode

Global Config

5.8.5.7 **tacacs timeout**

This command is used to configure the TACACS request timeout of an instance.

Syntax
tacacs timeout <1-3> <1-255> **no tacacs timeout <1-3>**

<1-255> - max timeout (Range: 1 to 255).

<1-3> - The valid value of index is 1, 2, and 3.

no - This command is used to reset the timeout value to the default value.

Default Setting

3

Command Mode

Global Config

5.8.6 **Port Security Configuration Commands**

5.8.6.1 **port-security**

This command enables port locking at the system level (Global Config) or port level (Interface Config).

Syntax

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port-security **no port-security**

Default Setting

None

Command Mode

Global Config, Interface Config

5.8.6.2 **port-security max-dynamic**

This command sets the maximum of dynamically locked MAC addresses allowed on a specific port.

Syntax
port-security max-dynamic [<0-600>] **no port-security max-dynamic**

no - This command resets the maximum of dynamically locked MAC addresses allowed on a specific port to its default value.

Default Setting

600

Command Mode

Interface Config

5.8.6.3 **port-security max-static**

This command sets the maximum number of statically locked MAC addresses allowed on a specific port.

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Syntax
port-security max-static [<0-20>] **no port-security max-static**

no - This command resets the maximum number of statically locked MAC addresses allowed on a specific port to its default value.

Default Setting

20

Command Mode

Interface Config

5.8.6.4 port-security mac-address

This command adds a MAC address to the list of statically locked MAC addresses.

Syntax
port-security mac-address <mac-addr> <1-3965> **no port-security mac-address <mac-addr> <1-3965>**

<1-3965> VLAN ID

<mac-addr>

no - This command removes a MAC address from the list of statically locked MAC addresses.

Default Setting

None

Command Mode

Interface Config

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5.8.6.5 **port-security mac-address move**

This command converts dynamically locked MAC addresses to statically locked addresses.

Syntax
port-security mac-address move

Default Setting

None

Command Mode

Interface Config

5.9 CDP (Cisco Discovery Protocol) Commands

5.9.1 **Show Commands**

5.9.1.1 **show cdp**

This command displays the CDP configuration information.

Syntax

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show cdp

Default Setting

None

Command Mode

Privileged Exec

Display Message

CDP Admin Mode: CDP enable or disable

CDP Holdtime (sec): The length of time a receiving device should hold the FortiSwitch-100 CDP information before discarding it

CDP Transmit Interval (sec): A period of the FortiSwitch-100 to send CDP packet

Ports: Port number vs CDP status

CDP: CDP enable or disable

5.9.1.2 **show cdp neighbors**

This command displays the CDP neighbor information.

Syntax
show cdp neighbors

Default Setting

None

Command Mode

Privileged Exec

Display Message

Device Id: Identifies the device name in the form of a character string.

Local Interface: The CDP neighbor information receiving port.

Holdtime: The length of time a receiving device should hold CDP information before discarding it.

Capability: Describes the device's functional capability in the form of a device type, for example, a switch.

Platform: Describes the hardware platform name of the device, for example, Fortinet FortiSwitch-100.

Port Id: Identifies the port on which the CDP packet is sent.

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5.9.1.3 **show cdp traffic**

This command displays the CDP traffic counters information.

Syntax
show cdp traffic

Default Setting

None

Command Mode

Privileged Exec

Display Message

Incoming packet number: Received legal CDP packets number from neighbors.

Outgoing packet number: Transmitted CDP packets number from this device.

Error packet number: Received illegal CDP packets number from neighbors.

5.9.2 **Configuration Commands**

5.9.2.1 **cdp**

This command is used to enable CDP Admin Mode.

Syntax
cdp **no cdp**

no - This command is used to disable CDP Admin Mode.

Default Setting

Enabled

Command Mode

Global Config

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5.9.2.2 **cdp run**

This command is used to enable CDP on a specified interface.

Syntax
cdp run
no cdp run

no - This command is used to disable CDP on a specified interface.

Default Setting

Enabled

Command Mode

Interface Config

This command is used to enable CDP for all interfaces.

Syntax
cdp run all
no cdp run all

all - All interfaces.

no - This command is used to disable CDP for all interfaces.

Default Setting

Enabled

Command Mode

Global Config

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5.9.2.3 **cdp timer**

This command is used to configure an interval time (seconds) of the sending CDP packet.

Syntax
cdp timer <5-254> **no cdp timer**

<5-254> - interval time (Range: 5 – 254).

no - This command is used to reset the interval time to the default value.

Default Setting

60

Command Mode

Global Config

5.9.2.4 **cdp holdtime**

This command is used to configure the hold time (seconds) of CDP.

Syntax
cdp holdtime <10-255>

<10-255> - interval time (Range: 10 – 255).

no - This command is used to hold time to the default value.

Default Setting

180

Command Mode

Global Config

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5.10 SNTP (Simple Network Time Protocol) Commands

5.10.1 **Show Commands**

5.10.1.1 **show sntp**

This command displays the current time and configuration settings for the SNTP client, and indicates whether the local time has been properly updated.

Syntax
show sntp

Default Setting

None

Command Mode

Privileged Exec

Display Message

Last Update Time Time of last clock update.
Last Unicast Attempt Time Time of last transmit query (in unicast mode).
Last Attempt Status Status of the last SNTP request (in unicast mode) or unsolicited message (in broadcast mode).
Broadcast Count Current number of unsolicited broadcast messages that have been received and processed by the SNTP client since last reboot.
Time Zone Time zone configured.

This command displays SNTP client settings.

Syntax
show sntp client

Default Setting

None

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Command Mode

Privileged Exec

Display Message

Client Supported Modes Supported SNTP Modes (Broadcast, Unicast, or Multicast).
SNTP Version The highest SNTP version the client supports.
Port SNTP Client Port
Client Mode: Configured SNTP Client Mode.
Unicast Poll Interval Poll interval value for SNTP clients in seconds as a power of two.
Poll Timeout (Seconds) Poll timeout value in seconds for SNTP clients.
Poll Retry Poll retry value for SNTP clients.

This command displays configured SNTP servers and SNTP server settings.

Syntax
show sntp server

Default Setting

None

Command Mode

Privileged Exec

Display Message

Server IP Address IP Address of configured SNTP Server
Server Type Address Type of Server.
Server Stratum Claimed stratum of the server for the last received valid packet.
Server Reference ID Reference clock identifier of the server for the last received valid packet.
Server Mode SNTP Server mode.
Server Max Entries Total number of SNTP Servers allowed.
Server Current Entries Total number of SNTP configured.
For each configured server:
IP Address IP Address of configured SNTP Server.
Address Type Address Type of configured SNTP server.
Priority IP priority type of the configured server.
Version SNTP Version number of the server. The protocol version used to query the server in unicast mode.
Port Server Port Number
Last Attempt Time Last server attempt time for the specified server.
Last Update Status Last server attempt status for the server.
Total Unicast Requests Number of requests to the server.
Failed Unicast Requests Number of failed requests from server.

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5.10.2 Configuration Commands

5.10.2.1 sntp broadcast client poll-interval

This command will set the poll interval for SNTP broadcast clients in seconds as a power of two where <poll-interval> can be a value from 6 to 16.

Syntax
sntp broadcast client poll-interval <6-10>
no sntp broadcast client poll-interval

<6-10> - The range is 6 to 16.

no - This command will reset the poll interval for SNTP broadcast client back to its default value.

Default Setting

6

Command Mode

Global Config

5.10.2.2 sntp client mode

This command will enable Simple Network Time Protocol (SNTP) client mode and optionally setting the mode to either broadcast, multicast, or unicast.

Syntax
sntp client mode [broadcast | unicast]
no sntp client mode

no - This command will disable Simple Network Time Protocol (SNTP) client mode.

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Default Setting

None

Command Mode

Global Config

5.10.2.3 **sntp client port**

This command will set the SNTP client port id and polling interval in seconds.

Syntax
sntp client port <portid> [<6-10>] **no sntp client port**

<portid> - SNTP client port id.
<6-10> - Polling interval. It's 2^(value) seconds where value is 6 to 10.
no - Resets the SNTP client port id.

Default Setting

The default portid is 123.

Command Mode

Global Config

5.10.2.4 **sntp unicast client poll-interval**

This command will set the poll interval for SNTP unicast clients in seconds.

Syntax
sntp unicast client poll-interval <6-10>

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no sntp unicast client poll-interval

<6-10> - Polling interval. It's 2^(value) seconds where value is 6 to 10.
no - This command will reset the poll interval for SNTP unicast clients to its default value.

Default Setting

The default value is 6.

Command Mode

Global Config

5.10.2.5 **sntp unicast client poll-timeout**

This command will set the poll timeout for SNTP unicast clients in seconds.

Syntax
sntp unicast client poll-timeout <poll-timeout> **no sntp unicast client poll-timeout**

< poll-timeout > - Polling timeout in seconds. The range is 1 to 30.
no - This command will reset the poll timeout for SNTP unicast clients to its default value.

Default Setting

The default value is 5.

Command Mode

Global Config

5.10.2.6 **sntp unicast client poll-retry**

This command will set the poll retry for SNTP unicast clients in seconds.

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Syntax

sntp unicast client poll-retry <poll-retry>

no sntp unicast client poll-retry

< poll-retry> - Polling retry in seconds. The range is 0 to 10.

no - This command will reset the poll retry for SNTP unicast clients to its default value.

Default Setting

The default value is 1.

Command Mode

Global Config

5.10.2.7 **sntp server**

This command configures an SNTP server (with a maximum of three) where the server address can be an ip address or a domain name and the address type either ipv4 or dns. The optional priority can be a value of 1-3, the version is a value of 1-4, and the port id is a value of 1-65535.

Syntax

sntp server <ipaddress/domain-name> <addresstype> [<1-3> [<version> [<portid>]]]

no sntp server remove <ipaddress/domain-name>

< ipaddress/domain-name > - IP address of the SNTP server.
< addresstype > - The address type is ipv4 or dns.
<1-3> - The range is 1 to 3.
<version> - The range is 1 to 4.
<portid> - The range is 1 to 65535.

no - This command deletes an server from the configured SNTP servers.

Default Setting

None.

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Command Mode

Global Config

5.10.2.8 **sntp clock timezone**

This command sets the time zone for the switch's internal clock.

Syntax
sntp clock timezone <name> <0-12> <0-59> {before-utc | after-utc}

<name> - Name of the time zone, usually an acronym. (Range: 1-15 characters)

<0-12> - Number of hours before/after UTC. (Range: 0-12 hours)

<0-59> - Number of minutes before/after UTC. (Range: 0-59 minutes)

before-utc - Sets the local time zone before (east) of UTC.

after-utc - Sets the local time zone after (west) of UTC.

Default Setting

Taipei 08:00 After UTC

Command Mode

Global Config

5.11 System Utilities

5.11.1 **clear**

5.11.1.1 **clear arp**

This command causes all ARP entries of type dynamic to be removed from the ARP cache.

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Syntax
clear arp

Default Setting

None

Command Mode

Privileged Exec

5.11.1.2 clear traplog

This command clears the trap log.

Syntax
clear traplog

Default Setting

None

Command Mode

Privileged Exec

5.11.1.3 clear eventlog

This command is used to clear the event log, which contains error messages from the system.

Syntax
clear eventlog

Default Setting

None

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Command Mode

Privileged Exec

5.11.1.4 clear logging buffered

This command is used to clear the message log maintained by the switch. The message log contains system trace information.

Syntax
clear logging buffered

Default Setting

None

Command Mode

Privileged Exec

5.11.1.5 clear config

This command resets the configuration to the factory defaults without powering off the switch. The switch is automatically reset when this command is processed. You are prompted to confirm that the reset should proceed.

Syntax
clear config

Default Setting

None

Command Mode

Privileged Exec

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5.11.1.6 **clear pass**

This command resets all user passwords to the factory defaults without powering off the switch. You are prompted to confirm that the password reset should proceed.

Syntax
clear pass

Default Setting

None

Command Mode

Privileged Exec

5.11.1.7 **clear counters**

This command clears the stats for a specified <slot/port> or for all the ports or for the entire switch based upon the argument.

Syntax
clear counters [<slot/port> | all]

<slot/port> - is the desired interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

5.11.1.8 **clear dns counter**

This command clears the DNS statistics.

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Syntax
clear dns counter

Default Setting

None

Command Mode

Privileged Exec

5.11.1.9 clear dns cache

This command clears all entries from the DNS cache.

Syntax
clear dns cache

Default Setting

None

Command Mode

Privileged Exec

5.11.1.10 clear cdp

This command is used to clear the CDP neighbors information and the CDP packet counters.

Syntax
clear cdp [traffic]

traffic - this command is used to clear the CDP packet counters.

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Default Setting

None

Command Mode

Privileged Exec

5.11.1.11 clear vlan

This command resets VLAN configuration parameters to the factory defaults.

Syntax
clear vlan

Default Setting

None

Command Mode

Privileged Exec

5.11.1.12 enable passwd

This command changes Privileged EXEC password.

Syntax
enable passwd

Default Setting

None

Command Mode

Global Config.

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5.11.1.13 **clear igmp snooping**

This command clears the tables managed by the IGMP Snooping function and will attempt to delete these entries from the Multicast Forwarding Database.

Syntax
clear igmp snooping

Default Setting

None

Command Mode

Privileged Exec

5.11.1.14 **clear port-channel**

This command clears all port-channels (LAGs).

Syntax
clear port-channel

Default Setting

None

Command Mode

Privileged Exec

5.11.1.15 **clear ip filter**

This command is used to clear all ip filter entries.

Syntax

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clear ip filter

Default Setting

None

Command Mode

Privileged Exec

5.11.1.16 clear dot1x statistics

This command resets the 802.1x statistics for the specified port or for all ports.

Syntax

clear dot1x statistics {all | <slot/port>}

<slot/port> - is the desired interface number.

all - All interfaces.

Default Setting

None

Command Mode

Privileged Exec

5.11.1.17 clear radius statistics

This command is used to clear all RADIUS statistics.

Syntax

clear radius statistics

Default Setting

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None

Command Mode

Privileged Exec

5.11.1.18 clear tacacs

This command is used to clear TACACS configuration.

Syntax
clear tacacs

Default Setting

None

Command Mode

Privileged Exec

5.11.2 copy

This command uploads and downloads to/from the switch. Local URLs can be specified using tftp or xmodem. The following can be specified as the source file for uploading from the switch: startup config (startup-config), event log (eventlog), message log (msglog) and trap log (traplog). A URL is specified for the destination.

The command can also be used to download the startup config or code image by specifying the source as a URL and destination as startup-config or image respectively.

The command can be used to the save the running config to flash by specifying the source as running-config and the destination as startup-config {*filename*}.

The command can also be used to download ssh key files as sshkey-rsa, sshkey-rsa2, and sshkey-dsa and http secure-server certificates as sslpem-root, sslpem- server, sslpem-dhweak, and sslpem-dhstrong.

Files upload to PC

Syntax

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copy startup-config <sourcefilename> <url>

copy {errorlog | log | traplog} <url>

copy script <sourcefilename> <url>

where <url>={xmodem | tftp://ipaddr/path/file}

<sourcefilename> - The filename of a configuration file or a script file.

<url> - xmodem or tftp://ipaddr/path/file.

errorlog - event Log file.

log - message Log file.

traplog - trap Log file.

Default Setting

None

Command Mode

Privileged Exec

Files download from PC to board

Syntax

copy <url> startup-config <destfilename>

copy <url> image <destfilename>

copy <url> {sshkey-rsa1 | sshkey-rsa2 | sshkey-dsa}

copy <url> {sslpem-root | sslpem-server | sslpem-dhweak | sslpem-dhstrong}

copy <url> script <destfilename>

where <url>={xmodem | tftp://ipaddr/path/file}

<destfilename> - name of the image file or the script file.

<url> - xmodem or tftp://ipaddr/path/file.

sshkey-rsa1 - SSH RSA1 Key file.

sshkey-rsa2 - SSH RSA2 Key file.

sshkey-dsa - SSH DSA Key file.

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sslpem-root - Secure Root PEM file.

sslpem-server - Secure Server PEM file.

sslpem-dhweak - Secure DH Weak PEM file.

sslpem-dhstrong - Secure DH Strong PEM file.

Default Setting

None

Command Mode

Privileged Exec

Write running configuration file into flash

Syntax
copy running-config startup-config [filename]

[filename] – name of the configuration file.

Default Setting

None

Command Mode

Privileged Exec

Notes

- Using the optional [filename] parameter sets that file name as the system default location for the startup configuration. The system will now use that file for its startup configuration, and future uses of **copy running-config startup-config** will copy the running config to the same file.
- There is a maximum memory limit of 2 configuration files; the original system default and one user-created file. To create a new config file, you must first delete any user-created config files from memory.

This command upload or download the pre-login banner file

Syntax
copy clibanner <url> **copy <url> clibanner**

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no clibanner

<url> - xmodem or tftp://ipaddr/path/file.

no - Delete CLI banner.

Default Setting

None

Command Mode

Privileged Exec

5.11.3 **delete**

This command is used to delete a configuration or image file.

Syntax
delete <filename>

<filename> - name of the configuration or image file.

Default Setting

None

Command Mode

Privileged Exec

5.11.4 **dir**

This command is used to display a list of files in Flash memory.

Syntax
dir [boot-rom | config | opcode [<filename>]]

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<filename> - name of the configuration or image file.

boot-rom - bootrom.

config - configuration file.

opcode - run time operation code.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Column Heading	Description
date	The date that the file was created.
file name	The name of the file.
file type	File types: Boot-Rom, Operation Code, and Config file.
startup	Shows if this file is used when the system is started.
size	The length of the file in bytes.

5.11.5 **whichboot**

This command is used to display which files were booted when the system powered up.

Syntax
whichboot

Default Setting

None

Command Mode

Privileged Exec

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5.11.6 **boot-system**

This command is used to specify the file or image used to start up the system.

Syntax
boot-system {boot-rom | config | opcode} <filename>

<filename> - name of the configuration or image file.

boot-rom - bootrom.

config - configuration file.

opcode - run time operation code.

Default Setting

None

Command Mode

Privileged Exec

5.11.7 **ping**

This command checks if another computer is on the network and listens for connections. To use this command, configure the switch for network (in-band) connection (as described in the *FASTPATH 2402/ 4802 Hardware User Guide*). The source and target devices must have the ping utility enabled and running on top of TCP/IP. The switch can be pinged from any IP workstation with which the switch is connected through the default VLAN (VLAN 1), as long as there is a physical path between the switch and the workstation. The terminal interface sends, three pings to the target station.

Syntax
ping <host>

<host> - A host name or an IP address.

Default Setting

None

Command Mode

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Privileged Exec

Ping on changing parameter value

Syntax
ping <host> count <0-20000000> [size <32-512>] **ping <host> size <32-512> [count <0-20000000>]**

<ipaddr> - an IP address.

<0-20000000> - number of pings (Range: 0 - 20000000). Note that 0 means infinite.

<size> - packet size (Range: 32 - 512).

Default Setting

Count = 5

Size = 32

Command Mode

Privileged Exec

5.11.8 **traceroute**

This command is used to discover the routes that packets actually take when traveling to their
destination through the network on a hop-by-hop basis. <ipaddr> should be a valid IP address. [port] should be a valid decimal integer in the range of 0(zero) to 65535. The default value is 33434. The optional port parameter is the UDP port used as the destination of packets sent as part of the traceroute. This port should be an unused port on the destination system.

Syntax
traceroute <host> [hops <1-255> [waittime <1-255>]] **traceroute <host> [waittime <1-255> [hops <1-255>]]**

<host> - A host name or an IP address.

<1-255> - Time to wait for a response to a probe, in seconds.

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<1-255> - The maximum time to live used in outgoing probe packets.

Default Setting

None

Command Mode

Privileged Exec

5.11.9 logging cli-command

This command enables the CLI command Logging feature. The Command Logging component enables the switch to log all Command Line Interface (CLI) commands issued on the system.

Syntax
logging cli-command

Default Setting

None

Command Mode

Global Config

5.11.10 calendar set

This command is used to set the system clock.

Syntax
calendar set <hh:mm:ss> <1-31> <1-12> <2000-2099>

<hh:mm:ss> - hh in 24-hour format (Range: 0 - 23), mm (Range: 0 - 59), ss (Range: 0 - 59)

<1-31> - Day of month. (Range: 1 - 31).

<1-12> - Month. (Range: 1 - 12).

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<2000-2099> - Year (4-digit). (Range: 2000 - 2099).

Default Setting

None

Command Mode

Privileged Exec

5.11.11 **reload**

This command resets the switch without powering it off. Reset means that all network connections are terminated and the boot code executes. The switch uses the stored configuration to initialize the switch. You are prompted to confirm that the reset should proceed. A successful reset is indicated by the LEDs on the switch.

Syntax
reload [slot]

Default Setting

None

Command Mode

Privileged Exec

5.11.12 **configure**

This command is used to activate global configuration mode

Syntax
configure

Default Setting

None

Command Mode

Privileged Exec

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5.11.13 **disconnect**

This command is used to close a telnet session.

Syntax
disconnect {<0-10> | all}

<0-11> - telnet session ID.

all - all telnet sessions.

Default Setting

None

Command Mode

Privileged Exec

5.11.14 **hostname**

This command is used to set the prompt string.

Syntax
hostname <prompt_string>

< prompt_string > - Prompt string.

Default Setting

Fortinet

Command Mode

Privileged Exec

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5.11.15 **quit**

This command is used to exit a CLI session.

Syntax
quit

Default Setting

None

Command Mode

Privileged Exec

5.12 Differentiated Service Command

Note: This Switching Command function can only be used on the QoS software version.

This chapter contains the CLI commands used for the QOS Differentiated Services (DiffServ) package.

The user configures DiffServ in several stages by specifying:
1. Class

- creating and deleting classes
- defining match criteria for a class

Note: The only way to remove an individual match criterion from an existing class definition is to delete the class and re-create it.

2. Policy

- creating and deleting policies
- associating classes with a policy
- defining policy statements for a policy/class combination

3. Service

- adding and removing a policy to/from a directional (that is, inbound, outbound) interface

Packets are filtered and processed based on defined criteria. The filtering criteria are defined by a class. The processing is defined by a policy's attributes. Policy attributes may be defined on a per class instance basis, and it is these attributes that are applied when a match occurs.

Packet processing begins by testing the match criteria for a packet. A policy is applied to a packet when a class match within that policy is found.

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Note that the type of class - all, any, or acl - has a bearing on the validity of match criteria specified when defining the class. A class type of 'any' processes its match rules in an ordered sequence; additional rules specified for such a class simply extend this list. A class type of ‘acl’ obtains its rule list by interpreting each ACL rule definition at the time the Diffserv class is created. Differences arise when specifying match criteria for a class type 'all', since only one value for each non-excluded match field is allowed within a class definition. If a field is already specified for a class, all subsequent attempts to specify the same field fail, including the cases where a field can be specified multiple ways through alternative formats. The exception to this is when the 'exclude' option is specified, in which case this restriction does not apply to the excluded fields.

The following class restrictions are imposed by the FortiSwitch-100 Switch DiffServ design:

• nested class support limited to:

• 'all' within 'all'

• no nested 'not' conditions
• no nested 'acl' class types
• each class contains at most one referenced class
• hierarchical service policies not supported in a class definition

• access list matched by reference only, and must be sole criterion in a class

• that is, ACL rules copied as class match criteria at time of class creation, with class type 'any'
• implicit ACL 'deny all' rule also copied
• no nesting of class type 'acl'

Regarding nested classes, referred to here as class references, a given class definition can contain at most one reference to another class, which can be combined with other match criteria. The referenced class is truly a reference and not a copy, since additions to a referenced class affect all classes that reference it. Changes to any class definition currently referenced by any other class must result in valid class definitions for all derived classes otherwise the change is rejected. A class reference may be removed from a class definition.

The user can display summary and detailed information for classes, policies, and services. All configuration information is accessible via the CLI, Web, and SNMP user interfaces.

5.12.1 General Commands

The following characteristics are configurable for the platform as a whole.

5.12.1.1 diffserv

This command sets the DiffServ operational mode to active. While disabled, the DiffServ configuration is retained and can be changed, but it is not activated. When enabled, Diffserv services are activated.

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Syntax
Diffserv

Command Mode

Global Config

5.12.1.2 **no diffserv**

This command sets the DiffServ operational mode to inactive. While disabled, the DiffServ configuration is retained and can be changed, but it is not activated. When enabled, Diffserv services are activated.

Syntax
no diffserv

Command Mode

Global Config

5.12.2 **Class Commands**

The 'class' command set is used in DiffServ to define:

Traffic Classification specifies Behavior Aggregate (BA) based on DSCP, and Multi- Field (MF) classes of traffic (name, match criteria)

Service Levels specifies the BA forwarding classes / service levels. Conceptually, DiffServ is a two-level hierarchy of classes: 1. Service/PHB, 2. Traffic Class

This set of commands consists of class creation/deletion and matching, with the class match commands specifying layer 3, layer 2, and general match criteria. The class match criteria are also known as class rules, with a class definition consisting of one or more rules to identify the traffic belonging to the class. Note that once a class match criterion is created for a class, it cannot be changed or deleted - the entire class must be deleted and re-created.

The CLI command root is ***class-map***.

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5.12.2.1 **class-map**

This command defines a new DiffServ class of type match-all, match-any or match-access-group.

Syntax
class-map [match-all] <class-map-name>

<class-map-name> is a case sensitive alphanumeric string from 1 to 31 characters uniquely identifying the class.

Note: The class name 'default' is reserved and must not be used here.
When used without any match condition, this command enters the class-map mode. The **<class-map-name>** is the name of an existing DiffServ class.

Note: The class name 'default' is reserved and is not allowed here. The class type of **match-all** indicates all of the individual match conditions must be true for a packet to be considered a member of the class. The class type of **match-access-group** indicates the individual class match criteria are evaluated based on an access list (ACL).

<**aclid>** is an integer specifying an existing ACL number (refer to the appropriate ACL documentation for the valid ACL number range). A **matchaccess-group** class type copies its set of match criteria from the current rule definition of the specified ACL number. All elements of a single ACL Rule are treated by DiffServ as a grouped set, similar to class type all. For any class, at least one class match condition must be specified for the class to be considered valid.

Note: The class match conditions are obtained from the referenced access list **at the time of class creation**. Thus, any subsequent changes to the referenced ACL definition do not affect the DiffServ class. To pick up the latest ACL definition, the DiffServ class must be deleted and recreated. This command may be used without specifying a class type to enter the Class-Map Config mode for an existing DiffServ class.

Note: The CLI mode is changed to Class-Map Config when this command is successfully executed.

Command Mode
Global Config

5.12.2.2 **no class-map**

This command eliminates an existing DiffServ class.

Syntax
no class-map <class-map-name>

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<class-map-name> is the name of an existing DiffServ class.

Note: The class name 'default' is reserved and is not allowed here. This command may be issued at any time; if the class is currently referenced by one or more policies or by any other class, this deletion attempt shall fail.

Command Mode
Global Config

5.12.2.3 **class-map rename**

This command changes the name of a DiffServ class.

Syntax
class-map rename <class-map-name> <new-class-map-name>

<class-map-name> is the name of an existing DiffServ class.
<new-class-map-name> is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the class.

Note: The class name ‘default’ is reserved and must not be used here.

Default
None
Command Mode
Global Config

5.12.2.4 **match any**

This command adds to the specified class definition a match condition whereby all packets are considered to belong to the class.

Syntax
match any

Default
None

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Command Mode
Class-Map Config

5.12.2.5 **match class-map**

This command adds to the specified class definition the set of match conditions defined for another class.

Syntax
match class-map <refclassname>

<**refclassname>** is the name of an existing DiffServ class whose match conditions are being referenced by the specified class definition.

Note: There is no [**not**] option for this match command.

Default
None

Command Mode
Class-Map Config

Restrictions The class types of both <***classname>*** and <***refclassname>*** must be identical (that is, any vs. any, or all vs. all). A class type of acl is not supported by this command. Cannot specify ***<refclassname>*** the same as <***classname>*** (that is, self-referencing of class name not allowed). At most one other class may be referenced by a class. Any attempt to delete the <***refclassname>*** class while still referenced by any <***classname***> shall fail.

The combined match criteria of <***classname>*** and <***refclassname>*** must be an allowed combination based on the class type. Any subsequent changes to the <***refclassname>*** class match criteria must maintain this validity, or the change attempt shall fail. The total number of class rules formed by the complete reference class chain (includes both predecessor and successor classes) must not exceed a platform-specific maximum. In some cases, each removal of a refclass rule reduces the maximum number of available rules in the class definition by one.

5.12.2.6 **no match class-map**

This command removes from the specified class definition the set of match conditions defined for another class.

Syntax

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no match class-map <refclassname>

<**refclassname>** is the name of an existing DiffServ class whose match conditions are being referenced by the specified class definition.

Note: There is no [**not**] option for this match command.

Default
None
Command Mode
Class-Map Config

5.12.2.7 **match dstip**

This command adds to the specified class definition a match condition based on the destination IP address of a packet.

Syntax
match dstip <ipaddr> <ipmask>

<ipaddr> specifies an IP address.
<**ipmask>** specifies an IP address bit mask; note that although similar to a standard subnet mask, this bit mask need not be contiguous.

Default
None

Command Mode
Class-Map Config

5.12.2.8 **match dstl4port**

This command adds to the specified class definition a match condition based on the destination layer 4 port of a packet using a single keyword or numeric notation or a numeric range notation.

Syntax
match dstl4port {<portkey> | <0-65535>}

To specify the match condition as a single keyword, the value for <**portkey>** is one of the supported port name keywords. The currently supported <**portkey>** values are: **domain,**

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echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp, www. Each of these translates into its equivalent port number, which is used as both the start and end of a port range.

To specify the match condition using a numeric notation, one layer 4 port number is required.

The port number is an integer from 0 to 65535.

To specify the match condition using a numeric range notation, two layer 4 port numbers are required and together they specify a contiguous port range. Each port number is an integer from 0 to 65535, but with the added requirement that the second number be equal to or greater than the first.

Default
None

Command Mode
Class-Map Config

5.12.2.9 **match ip dscp**

This command adds to the specified class definition a match condition based on the value of the IP DiffServ Code Point (DSCP) field in a packet, which is defined as the high-order six bits of the Service Type octet in the IP header (the low-order two bits are not checked).

Syntax
match ip dscp <value>

<dscpval> value is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: **af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef**.

Note: The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

Note: To specify a match on all DSCP values, use the match [not] ip tos <tosbits> <tosmask> command with <**tosbits**> set to 0 and <**tosmask**> set to 03 (hex).

Default
None

Command Mode
Class-Map Config

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5.12.2.10 **match ip precedence**

This command adds to the specified class definition a match condition based on the value of the IP Precedence field in a packet, which is defined as the high-order three bits of the Service Type octet in the IP header (the low-order five bits are not checked). The precedence value is an integer from 0 to 7.

Syntax
match ip precedence <0-7>

Note: The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

Note: To specify a match on all Precedence values, use the match [not] ip tos <tosbits> <tosmask> command with <**tosbits>** set to 0 and <**tosmask>** set to 1F (hex).

Default
None

Command Mode
Class-Map Config

5.12.2.11 **match ip tos**

This command adds to the specified class definition a match condition based on the value of the IP TOS field in a packet, which is defined as all eight bits of the Service Type octet in the IP header.

Syntax
match ip tos <tosbits> <tosmask>

<**tosbits>** is a two-digit hexadecimal number from 00 to ff.
<**tosmask>** is a two-digit hexadecimal number from 00 to ff.
The <**tosmask>** denotes the bit positions in <**tosbits>** that are used for comparison against the IP TOS field in a packet. For example, to check for an IP TOS value having bits 7 and 5 set and bit 1 clear, where bit 7 is most significant, use a <**tosbits>** value of a0 (hex) and a <**tosmask>** of a2 (hex).

Note: The ip dscp, ip precedence, and ip tos match conditions are alternative ways to specify a match criterion for the same Service Type field in the IP header, but with a slightly different user notation.

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Note: In essence, this the “free form” version of the IP DSCP/Precedence/TOS match specification in that the user has complete control of specifying which bits of the IP Service Type field are checked.

Default
None

Command Mode
Class-Map Config

5.12.2.12 **match protocol**

This command adds to the specified class definition a match condition based on the value of the IP Protocol field in a packet using a single keyword notation or a numeric value notation.

Syntax
match protocol {<protocol-name> | <0-255>}

<**protocol-name>** is one of the supported protocol name keywords. The currently supported values are: **icmp, igmp, ip, tcp, udp**. Note that a value of **ip** is interpreted to match all protocol number values. To specify the match condition using a numeric value notation, the protocol number is a standard value assigned by IANA and is interpreted as an integer from 0 to 255.

Note: This command does not validate the protocol number value against the current list defined by IANA.

Default
None

Command Mode
Class-Map Config

5.12.2.13 **match srcip**

This command adds to the specified class definition a match condition based on the source IP address of a packet.

Syntax
match srcip <ipaddr> <ipmask>

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<ipaddr> specifies an IP address.

<**ipmask>** specifies an IP address bit mask; note that although it resembles a standard subnet mask, this bit mask need not be contiguous.

Default
None

Command Mode
Class-Map Config

5.12.2.14 **match srcl4port**

This command adds to the specified class definition a match condition based on the source layer 4 port of a packet using a single keyword or numeric notation or a numeric range notation.

Syntax
match srcl4port {<portkey> | <0-65535>}

<portkey> is one of the supported port name keywords (listed below).
The currently supported <portkey> values are: domain, echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp, www. Each of these translates into its equivalent port number, which is used as both the start and end of a port range.

To specify the match condition as a numeric value, one layer 4 port number is required. The port number is an integer from 0 to 65535.

To specify the match condition as a range, two layer 4 port numbers are required and together they specify a contiguous port range. Each port number is an integer from 0 to 65535, but with the added requirement that the second number be equal to or greater than the first.

Default
None

Command Mode
Class-Map Config

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5.12.3 *Policy Commands*

The 'policy' command set is used in DiffServ to define:

Traffic Conditioning Specify traffic conditioning actions (policing, marking, shaping) to apply to traffic classes

Service Provisioning Specify bandwidth and queue depth management requirements of service levels (EF, AF, etc.)

The policy commands are used to associate a traffic class, which was defined by the class command set, with one or more QoS policy attributes. This association is then assigned to an interface in a particular direction to form a service. The user specifies the policy name when the policy is created.

The DiffServ CLI does not necessarily require that users associate only one traffic class to one policy. In fact, multiple traffic classes can be associated with a single policy, each defining a particular treatment for packets that match the class definition. When a packet satisfies the conditions of more than one class, preference is based on the order in which the classes were added to the policy, with the foremost class taking highest precedence.

This set of commands consists of policy creation/deletion, class addition/removal, and individual policy attributes. Note that the only way to remove an individual policy attribute from a class instance within a policy is to remove the class instance and re-add it to the policy. The values associated with an existing policy attribute can be changed without removing the class instance.

The CLI command root is ***policy-map***.

5.12.3.1 **assign-queue**

This command modifies the queue id to which the associated traffic stream is assigned. The queueid is an integer from 0 to n-1, where n is the number of egress queues supported by the device.

Syntax
assign-queue <0-6>

<0-6> - Queue ID.

Command Mode

Policy-Class-Map Config

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5.12.3.2 **drop**

This command specifies that all packets for the associated traffic stream are to be dropped at ingress.

Syntax
drop

Command Mode

Policy-Class-Map Config

5.12.3.3 **redirect**

This command specifies that all incoming packets for the associated traffic stream are redirected to a specific egress interface (physical port or port-channel).

Syntax
redirect <slot/port>

Command Mode

Policy-Class-Map Config

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5.12.3.4 **conform-color**

This command is used to enable color-aware traffic policing and define the conform-color class maps used. Used in conjunction with the police command where the fields for the conform level (for simple, single-rate, and two-rate policing) are specified. The <class-map-name> parameter is the name of an existing Diffserv class map, where different ones must be used for the conform and exceed colors.

Syntax
conform-color <class-map-name>

<class-map-name> - Name of an existing Diffserv class map, where different ones must be used for the conform colors.

Command Mode

Policy-Class-Map Config

5.12.3.5 **mark cos**

This command marks all packets for the associated traffic stream with the specified class of service value in the priority field of the 802.1p header. If the packet does not already contain this header, one is inserted. The CoS value is an integer from 0 to 7.

Syntax
mark cos <0-7>

<0-7> - The range of COS value is 0 to 7.

Command Mode

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Policy-Class-Map Config

Policy Type

In

5.12.3.6 **class**

This command creates an instance of a class definition within the specified policy for the purpose of defining treatment of the traffic class through subsequent policy attribute statements.

Syntax
class <classname>

<***classname***> is the name of an existing DiffServ class. Note that this command causes the specified policy to create a reference to the class definition.

Command Mode

Policy-Class-Map Config

5.12.3.7 **no class**

This command deletes the instance of a particular class and its defined treatment from the specified policy.

Syntax
no class <classname>

<**classname**> is the name of an existing DiffServ class. Note that this command removes the reference to the class definition for the specified policy.

Command Mode

Policy-Class-Map Config

5.12.3.8 **mark ip-dscp**

This command marks all packets for the associated traffic stream with the specified IP DSCP value.

Syntax

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mark ip-dscp <value>

<value> is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: ***af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef.***

Command Mode
Policy-Class-Map Config

Policy Type In
Incompatibilities Mark IP Precedence, Police (all forms)

5.12.3.9 **mark ip-precedence**

This command marks all packets for the associated traffic stream with the specified IP Precedence value. The IP Precedence value is an integer from 0 to 7.

Syntax

mark ip-precedence <0-7>

Command Mode
Policy-Class-Map Config

Policy Type In
Incompatibilities Mark IP DSCP, Police (all forms)

5.12.3.10 **police-simple**

This command is used to establish the traffic policing style for the specified class.

Syntax

police-simple {<1-4294967295> <1-128> conform-action
{drop | set-cos-transmit <0-7> | set-prec-transmit <0-7> | set-dscp-transmit

<value> | transmit} [violate-action {drop | set-prectransmit <0-7> | set-dscp-transmit <0-63> | transmit}]}

The simple form of the police command uses a single data rate and burst size, resulting in two outcomes:
<conform-action & violate-action> The conforming data rate is specified in kilobits-per-second (Kbps) and is an integer from 1 to 4294967295. The conforming burst size is specified in kilobytes (KB) and is an integer from 1 to 128. For each outcome, the only possible actions are drop, set-dscp-transmit, set-prec-transmit, or transmit. In this simple form of the police command, the conform action defaults to transmit and the violate action defaults to drop. These actions can be set with this command once the style has been configured. **<set-cos-transmit>**, an priority value is required and is specified as an integer

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from 0-7. **<set-dscp-transmit>** is required and is specified as either an integer from 0 to 63, or symbolically through one of the following keywords: **af11, af12, af13, af21, af22, af23, af31, af32, af33, af41, af42, af43, be, cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef**. **<set-prec-transmit>**, an IP Precedence value is required and is specified as an integer from 0-7.

Command Mode
Policy-Class-Map Config

Restrictions Only one style of police command, simple, is allowed for a given class instance in a particular policy.

Policy Type In
Incompatibilities Mark COS, Mark IP DSCP, Mark IP Precedence

5.12.3.11 **policy-map**

This command establishes a new DiffServ policy. The <policyname**>** parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the policy. The type of policy is specific to the inbound traffic direction as indicated by the in parameter.

Syntax

policy-map <policyname> [in]

no policy-map <policyname>

Command Mode
Global Config

Policy Type In

5.12.3.12 **policy-map rename**

This command changes the name of a DiffServ policy. The <policyname**>** is the name of an existing DiffServ class. The <newpolicyname**>** parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the policy.

Syntax

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policy-map rename <policyname> <newpolicyname>

<policyname> - Old Policy name.
<newpolicyname> - New policy name.

Command Mode
Global Config

Policy Type In

5.12.4 *Service Commands*

The 'service' command set is used in DiffServ to define:

Traffic Conditioning Assign a DiffServ traffic conditioning policy (as specified by the policy commands) to an interface in the incoming direction.
Service Provisioning Assign a DiffServ service provisioning policy (as specified by the policy commands) to an interface in the outgoing direction

The service commands attach a defined policy to a directional interface. Only one policy may be assigned at any one time to an interface in a particular direction. The policy type (in, out) must match the interface direction to which it is attached.

This set of commands consists of service addition/removal.

The CLI command root is service-policy

5.12.4.1 **service-policy**

This command attaches a policy to an interface in a particular direction.

Syntax
service-policy in <policy-map-name>

The command can be used in the **Interface Config** mode to attach a policy to a specific interface. Alternatively, the command can be used in the **Global Config** mode to attach this policy to all system interfaces. The direction value is either in or out.

<policy-map-name> is the name of an existing DiffServ policy, whose type must match the interface direction. Note that this command causes a service to create a reference to the policy.

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Note: This command effectively enables DiffServ on an interface (in a particular direction). There is no separate interface administrative 'mode' command for DiffServ.

Note: This command shall fail if any attributes within the policy definition exceed the capabilities of the interface. Once a policy is successfully attached to an interface, any attempt to change the policy definition such that it would result in a violation of said interface capabilities shall cause the policy change attempt to fail.

Command Mode

Global Config (for all system interfaces)
Interface Config (for a specific interface)

Restrictions Only a single policy may be attached to a particular interface in a particular direction at any one time.

5.12.4.2 **no service-policy**

This command detaches a policy from an interface in a particular direction.

Syntax
no service-policy in <policy-map-name>

The command can be used in the Interface Config mode to detach a policy from a specific interface. Alternatively, the command can be used in the Global Config mode to detach this policy from all system interfaces to which it is currently attached. The direction value is either in or out.
<policy-map-name> is the name of an existing DiffServ policy. Note that this command causes a service to remove its reference to the policy.

Note: This command effectively disables DiffServ on an interface (in a particular direction). There is no separate interface administrative 'mode' command for DiffServ.

Command Mode

Global Config (for all system interfaces)
Interface Config (for a specific interface)

5.12.5 **Show Commands**

The 'show' command set is used in DiffServ to display configuration and status information for:

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- Classes
- Policies
- Services

This information can be displayed in either summary or detailed formats. The status information is only shown when the DiffServ administrative mode is enabled; it is suppressed otherwise. There is also a 'show' command for general DiffServ information that is available at any time.

5.12.5.1 **show class-map**

This command displays all configuration information for the specified class.

Syntax
show class-map [<classname>]

<classname> is the name of an existing DiffServ class.

Default Setting

None

Command Mode

Privileged EXEC and User EXEC

Display Message

Class Name The name of this class.

Class Type The class type (all, any, or acl) indicating how the match criteria are evaluated for this class. A class type of all means every match criterion defined for the class is evaluated simultaneously they must all be true to indicate a class match. For a type of any each match criterion is evaluated sequentially and only one need be true to indicate a class match. Class type acl rules are evaluated in a hybrid manner, with those derived from each ACL Rule grouped and evaluated simultaneously, while each such grouping is evaluated sequentially.

Match Criteria The Match Criteria fields will only be displayed if they have been configured. They will be displayed in the order entered by the user. These are evaluated in accordance with the class type. The possible Match Criteria fields are: Class of Service, Destination IP Address, Destination Layer 4 Port, Destination MAC Address, Every, IP DSCP, IP

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Precedence, IP TOS, Protocol Keyword, Reference Class, Source IP Address, Source Layer 4 Port, Source MAC Address, and VLAN.

Values This field displays the values of the Match Criteria.

Excluded This field indicates whether this Match Criteria is excluded. If the Class Name is not specified, this command displays a list of all defined DiffServ classes. The following fields are displayed:

Class Name The name of this class. (Note that the order in which classes are displayed is not necessarily the same order in which they were created.)

Class Type The class type (all, any, or acl) indicating how the match criteria are evaluated for this class. A class type of all means every match criterion defined for the class is evaluated simultaneously they must all be true to indicate a class match. For a type of any each match criterion is evaluated sequentially and only one need be true to indicate a class match. Class type acl rules are evaluated in a hybrid manner, with those derived from each ACL Rule grouped and evaluated simultaneously, while each such grouping is evaluated sequentially.

ACL Number The ACL number used to define the class match conditions at the time the class was created. This field is only meaningful if the class type is acl. (Note that the contents of the ACL may have changed since this class was created.)

Ref Class Name The name of an existing DiffServ class whose match conditions are being referenced by the specified class definition.

5.12.5.2 **show diffserv**

This command displays the DiffServ General Status Group information, which includes the current administrative mode setting as well as the current and maximum number of rows in each of the main DiffServ private MIB tables.

Syntax
show diffserv

Default Setting

None

Command Mode

Privileged EXEC and User EXEC

Display Message

DiffServ Admin mode The current value of the DiffServ administrative mode.
Class Table Size Current/Max The current or maximum number of entries (rows) in the Class Table.

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Class Rule Table Size Current/Max The current or maximum number of entries (rows) in the Class Rule Table.
Policy Table Size Current/Max The current or maximum number of entries (rows) in the Policy Table.
Policy Instance Table Size Current/Max The current or maximum number of entries (rows) in the Policy Instance Table.
Policy Attribute Table Size Current/Max The current or maximum number of entries (rows) in the Policy Attribute Table.
Service Table Size Current/Max The current or maximum number of entries (rows) in the Service Table.

5.12.5.3 **show policy-map**

This command displays all configuration information for the specified policy.

Syntax
show policy-map [<policy-map-name>]

<policy-map-name> is the name of an existing DiffServ policy.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

Policy Name The name of this policy.

Policy Type The policy type, namely whether it is an inbound or outbound policy definition.

The following information is repeated for each class associated with this policy (only those policy attributes actually configured are displayed):

Class Name The name of this class.

Mark CoS Denotes the class of service value that is set in the 802.1p header of outbound packets. This is not displayed if the mark cos was not specified.

Mark IP DSCP Denotes the mark/re-mark value used as the DSCP for traffic matching this class. This is not displayed if mark ip description is not specified using the police-two-rate command, or if policing is in use for the class under this policy.

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Mark IP Precedence Denotes the mark/re-mark value used as the IP Precedence for traffic matching this class. This is not displayed if either mark DSCP or policing is in use for the class under this policy.

Policing Style This field denotes the style of policing, if any, used simple.

Committed Rate (Kbps) This field displays the committed rate, used in simple policing, single-rate policing, and two-rate policing.

Committed Burst Size (KB) This field displays the committed burst size, used in simple policing.

Conform Action The current setting for the action taken on a packet considered to conform to the policing parameters. This is not displayed if policing is not in use for the class under this policy.

Conform COS Value This field shows the priority mark value if the conform action is markcos.

Conform DSCP Value This field shows the DSCP mark value if the conform action is markdscp.

Conform IP Precedence Value This field shows the IP Precedence mark value if the conform action is markprec.

Non-Conform Action The current setting for the action taken on a packet considered to not conform to the policing parameters. This is not displayed if policing not in use for the class under this policy.

Non-Conform DSCP Value This field displays the DSCP mark value if this action is markdscp.

Non-Conform IP Precedence Value This field displays the IP Precedence mark value if this action is markprec.

Bandwidth This field displays the minimum amount of bandwidth reserved in either percent or kilobits-per-second.

Policy Name The name of this policy. (Note that the order in which the policies are displayed is not necessarily the same order in which they were created.)

Policy Type The policy type, namely whether it is an inbound or outbound policy definition.

Class Members List of all class names associated with this policy.

5.12.5.4 **show diffserv service**

This command displays policy service information for the specified interface and direction.

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Syntax

show diffserv service <slot/port> in

<slot/port> specifies a valid slot number and port number for the system. The direction parameter indicates the interface direction of interest.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

DiffServ Admin Mode The current setting of the DiffServ administrative mode. An attached policy is only in effect on an interface while DiffServ is in an enabled mode.

Interface The slot number and port number of the interface (slot/port).

Direction The traffic direction of this interface service.

Operational Status The current operational status of this DiffServ service interface.

Policy Name The name of the policy attached to the interface in the indicated direction.

Policy Details Attached policy details, whose content is identical to that described for the show policy-map <policymapname> command (content not repeated here for brevity).

5.12.5.5 **show diffserv service brief**

This command displays all interfaces in the system to which a DiffServ policy has been attached. The direction parameter is optional; if specified, only services in the indicated direction are shown.

Syntax

show diffserv service brief [in]

Default Setting

None

Command Mode

Privileged EXEC

Display Message

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DiffServ Admin Mode The current setting of the DiffServ administrative mode. An attached policy is only active on an interface while DiffServ is in an enabled mode.

The following information is repeated for interface and direction (only those interfaces configured with an attached policy are shown):

Interface The slot number and port number of the interface (slot/port).

Direction The traffic direction of this interface service.

OperStatus The current operational status of this DiffServ service interface.

Policy Name The name of the policy attached to the interface in the indicated direction.

5.12.5.6 **show policy-map interface**

This command displays policy-oriented statistics information for the specified interface and direction.

Syntax
show policy-map interface <slot/port> in

<slot/port> specifies a valid slot number and port number for the system. The direction parameter indicates the interface direction of interest.

Command Mode

Privileged EXEC

Display Message

Interface The slot number and port number of the interface (slot/port).

Direction The traffic direction of this interface service, either in or out.
Operational Status The current operational status of this DiffServ service interface.

Policy Name The name of the policy attached to the interface in the indicated direction.

Interface Offered Octets/Packets A cumulative count of the octets/packets offered to this service interface in the specified direction before the defined DiffServ treatment is applied.

Interface Discarded Octets/Packets A cumulative count of the octets/packets discarded by this service interface in the specified direction for any reason due to DiffServ treatment.

Interface Sent Octets/Packets A cumulative count of the octets/packets forwarded by this service interface in the specified direction after the defined DiffServ treatment was applied. In this case, forwarding means the traffic stream was passed to the next functional element in the data path, such as the switching or routing function or an outbound link transmission element.

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The following information is repeated for each class instance within this policy:

Class Name The name of this class instance.

In Offered Octets/Packets A count of the octets/packets offered to this class instance before the defined DiffServ treatment is applied. Only displayed for the 'in' direction.

In Discarded Octets/Packets A count of the octets/packets discarded for this class instance for any reason due to DiffServ treatment of the traffic class. Only displayed for the 'in' direction.

Tail Dropped Octets/Packets A count of the octets/packets discarded due to tail dropping from a transmission queue, typically due to the effects of traffic shaping. These counts may not be supported on all platforms. Only displayed for the 'out' direction.

Random Dropped Octets/Packets A count of the octets/packets discarded due to WRED active queue depth management, typically due to the effects of traffic shaping. These counts are only applicable for a class instance whose policy attributes includes random dropping, and may not be supported on all platforms. Only displayed for the 'out' direction.

Shape Delayed Octets/Packets A count of the octets/packets that were delayed due to traffic shaping. These counts are only applicable for a class instance whose policy attributes includes shaping, and may not be supported on all platforms. Only displayed for the 'out' direction.

Sent Octets/Packets A count of the octets/packets forwarded for this class instance after the defined DiffServ treatment was applied. In this case, forwarding means the traffic stream was passed to the next functional element in the data path, such as the switching or routing function or an outbound link transmission element. Only displayed for the 'out' direction.

Note: None of the counters listed here are guaranteed to be supported on all platforms. Only supported counters are shown in the display output.

5.12.5.7 **show service-policy**

This command displays a summary of policy-oriented statistics information for all interfaces in the specified direction. The direction parameter indicates the interface direction of interest. This command enables or disables the route reflector client. A route reflector client relies on a route reflector to re-advertise its routes to the entire AS. The possible values for this field are ***enable*** and ***disable.***

Syntax
show service-policy [in]

Command Mode

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Privileged EXEC

Display Message

The following information is repeated for each interface and direction (only those interfaces configured with an attached policy are shown):

Interface The slot number and port number of the interface (slot/port).

Operational Status The current operational status of this DiffServ service interface.

Policy Name The name of the policy attached to the interface.

Note: None of the counters listed here are guaranteed to be supported on all platforms. Only supported counters are shown in the display output.

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5.13 ACL Command

5.13.1 **Show Commands**

5.13.1.1 **show mac access-lists**

This command displays a MAC access list and all of the rules that are defined for the ACL. The
<name> parameter is used to identify a specific MAC ACL to display.

Syntax
show mac access-list <name>

<name> ACL name which uniquely identifies the MAC ACL to display.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

MAC ACL Name The name of the MAC ACL rule.
Rule Number The ordered rule number identifier defined within the ACL.
Action Displays the action associated with each rule. The possible values are Permit or Deny.
Source MAC Address Displays the source MAC address for this rule.
Source MAC Mask Displays the source MAC mask for this rule.
Destination MAC Address Displays the destination MAC address for this rule.
Destination MAC Mask Displays the destination MAC mask for this rule.
Ethertype Displays the Ethertype keyword or custom value for this rule.
VLAN ID Displays the VLAN identifier value or range for this rule.
CoS Value Displays the COS (802.1p) value for this rule.
Secondary VLAN ID Displays the Secondary VLAN identifier value or range for this rule.
Secondary COS Displays the Secondary COS (802.1p) value for this rule.
Assign Queue Displays the queue identifier to which packets matching this rule are assigned.
Redirect Interface Displays the slot/port to which packets matching this rule are forwarded.

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5.13.1.2 **show mac access-lists**

This command displays a summary of all defined MAC access lists in the system.

Syntax
show mac access-list

Default Setting

None

Command Mode

Privileged EXEC

Display Message

Current number of all ACLs The number of user-configured rules defined for this ACL.
Maximum number of all ACLs The maximum number of ACL rules.
MAC ACL Name The name of the MAC ACL rule.
Rules The number of rule in this ACL.
Direction Denotes the direction in which this MAC ACL is attached to the set of interfaces listed. The possible values are Inbound or Outbound.
Interfaces Displays the list of interfaces (slot/port) to which this MAC ACL is attached in a given direction.

5.13.1.3 **show ip access-lists**

This command displays an Access Control List (ACL) and all of the rules that are defined for the ACL.

Syntax
show ip access-lists [<1-199>]

<1-199> is the number used to identify the ACL.

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Default Setting

None

Command Mode

Privileged EXEC

Display Message

Current number of ACLs The number of user-configured rules defined for this ACL.
Maximum number of ACLs The maximum number of ACL rules.
ACL ID The identifier of this ACL.
Rule This displays the number identifier for each rule that is defined for the ACL.
Action This displays the action associated with each rule. The possible values are Permit or Deny.
Match ALL Match all packets or not.
Protocol This displays the protocol to filter for this rule.
Source IP Address This displays the source IP address for this rule.
Source IP Mask This field displays the source IP Mask for this rule.
Source Ports This field displays the source port range for this rule.
Destination IP Address This displays the destination IP address for this rule.
Destination IP Mask This field displays the destination IP Mask for this rule.
Destination Ports This field displays the destination port range for this rule.
Service Type Field Match This field indicates whether an IP DSCP, IP Precedence, or IP TOS match condition is specified for this rule.
Service Type Field Value This field indicates the value specified for the Service Type Field Match (IP DSCP, IP Precedence, or IP TOS).

5.13.1.4 **show access-lists interface**

This command displays Access List information for a particular interface and the 'in' direction.

Syntax
show access-lists interface <slot/port> in

<slot/port> is the interface number.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

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ACL Type This displays ACL type is IP or MAC.
ACL ID This displays the ACL ID.
Sequence Number This indicates the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order.

5.13.2 Configuration Commands

5.13.2.1 mac access-list extended

This command creates a MAC Access Control List (ACL) identified by <name>, consisting of classification fields defined for the Layer 2 header of an Ethernet frame. The <name> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. If a MAC ACL by this name already exists, this command enters Mac-Access-List config mode to allow updating the existing ACL.

Syntax
mac access-list extended <name>
no mac access-list extended <name>

<name> - It uniquely identifies the MAC access list.

Default Setting

None

Command Mode

Global Config

5.13.2.2 mac access-list extended

This command changes the name of a MAC Access Control List (ACL). The <name> parameter is the name of an existing MAC ACL. The <newname> parameter is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying the MAC access list. This command fails if a MAC ACL by the name <newname> already exists.

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Syntax

mac access-list extended rename <name> <newname>

<name> - Old name which uniquely identifies the MAC access list.

<newname> - New name which uniquely identifies the MAC access list.

Default Setting

None

Command Mode

Global Config

5.13.2.3 **mac access-list**

This command creates a new rule for the current MAC access list. Each rule is appended to the list of configured rules for the list. Note that an implicit 'deny all' MAC rule always terminates the access list. Note: The 'no' form of this command is not supported, as the rules within an ACL cannot be deleted individually. Rather, the entire ACL must be deleted and re-specified.
A rule may either deny or permit traffic according to the specified classification fields. At a minimum, the source and destination MAC value and mask pairs must be specified, each of which may be substituted using the keyword any to indicate a match on any value in that field. The bpdu keyword may be specified for the destination MAC value/mask pair indicating a well-known BPDU MAC value of 01-80-c2-xx-xx-xx (hex), where 'xx' indicates a don't care. The remaining command parameters are all optional. The Ethertype may be specified as either a keyword or a four-digit hexadecimal value from 0x0600-0xFFFF. The currently supported <ethertypekey> values are: appletalk, arp, ibmsna, ipv4, ipv6, ipx, mplsmcast, mplsucast, netbios, novell, pppoe, rarp. Each of these translates into its equivalent Ethertype value(s). The assign-queue parameter allows specification of a particular hardware queue for handling traffic that matches this rule. The allowed <queue-id> value is 0-(n-1), where n is the number of user configurable queues available for the hardware platform. The redirect parameter allows the traffic matching this rule to be forwarded to the specified <slot/port>. The assign-queue and redirect parameters are only valid for a 'permit' rule.

Syntax

{deny|permit} {{<srcmac> <srcmacmask} | any} {{<dstmac> <dstmacmask>}| any | bpdu} [<ethertypekey> | <0x0600-0xFFFF>] [vlan {eq <1-3965>}] [cos <0-7>] [assign-queue <0-6>] [redirect <slot/port>]

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Default Setting

None

Command Mode

Mac Access-list Config

5.13.2.4 **mac access-group in**

This command attaches a specific MAC Access Control List (ACL) identified by <name> to an
interface in a given direction. The <name> parameter must be the name of an exsiting MAC ACL. An optional sequence number may be specified to indicate the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached access list using that sequence number. If the sequence number is not specified for this command, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction will be used. This command specified in 'Interface Config' mode only affects a single interface, whereas the 'Global Config' mode setting is applied to all interfaces. The 'Interface Config' mode command is only available on platforms that support independent per-port class of service queue configuration.

Syntax
mac access-group <name> in [<1-4294967295>] **no mac access-group <name> in**

<no> - This command removes a MAC ACL identified by <name> from the interface in a given direction.

Default Setting

None

Command Mode

Global Config, Interface Config

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5.13.2.5 **access-list**

This command creates an Access Control List (ACL) that is identified by the parameter.

Syntax
access-list {(<1-99> {deny | permit} <srcip> <srcmask>) | ({<100-199> {deny | permit} {evry | {{icmp | igmp | ip | tcp | udp | <number>} <srcip> <srcmask> [{eq {<portkey> | <portvalue>}}] <dstip> <dstmask> [{eq {<portkey> | <portvalue>}}] [precedence <precedence>] [tos <tos> <tosmask>] [dscp <dscp>]}})}

<accesslistnumber>. The ACL number is an integer from 1 to 199. The range 1 to 99 is for the normal ACL List and 100 to 199 is for the extended ACL List.

permit or deny**.** The ACL rule is created with two options. The protocol to filter for an ACL rule is specified by giving the protocol to be used like **i*cmp ,igmp ,ip ,tcp, udp****.* The command specifies a source ip address and source mask for match condition of the ACL rule specified by the ***srcip* and *srcmask*** parameters. The source layer 4 port match condition for the ACL rule is specified by the *port value p*arameter.

<portvalue> uses a single keyword notation and currently has the values of ***domain, echo, ftp, ftpdata, http, smtp, snmp, telnet, tftp*****,** and ***www***. Each of these values translates into its equivalent port number, which is used as both the start and end of a port range. The command specifies a destination ip address and destination mask for match condition of the ACL rule specified by the *dstip* and *dstmask* parameters. The command specifies the TOS for an ACL rule depending on a match of precedence or DSCP values using the parameters ***tos, tosmask, dscp***.

Default Setting

None

Command Mode

Global Config

5.13.2.6 **no access-list**

This command deletes an ACL that is identified by the parameter <*accesslistnumber*> from the system.

Syntax

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no access-list {<1-99> | <100-199>}

Note: The ACL number is an integer from 1 to 199. The range 1 to 99 is for the normal ACL List and 100 to 199 is for the extended ACL List.

Default Setting

None

Command Mode

Global Config

5.13.2.7 **ip access-group**

This command attaches a specified access-control list to an interface.

Syntax
ip access-group <1- 199> in [<1-4294967295>]

<1- 199> The identifier of this ACL.

<1-4294967295> The sequence number of this ACL.

Default Setting

None

Command Mode

Global Config, Interface Config

5.14 CoS (Class of Service) Command

5.14.1 ***Show Commands***

5.14.1.1 **show queue cos-map**

This command displays the current Dot1p (802.1p) priority mapping to internal traffic classes for a specific interface. The slot/port parameter is optional and is only valid on platforms that

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support independent per-port class of service mappings. If specified, the 802.1p mapping table of the interface is displayed. If omitted, the most recent global configuration settings are displayed.

Syntax
show queue cos-map <slot/port>

< slot/port > The interface number.

Default Setting

None

Command Mode

Privileged EXEC, User EXEC

Display Message

The following information is repeated for each user priority.
User Priority The 802.1p user priority value.
Traffic Class The traffic class internal queue identifier to which the user priority value is mapped.

5.14.1.2 show queue ip-precedence-mapping

This command displays the current IP Precedence mapping to internal traffic classes for a specific interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the IP Precedence mapping table of the interface is displayed. If omitted, the most recent global configuration settings are displayed.

Syntax
show queue ip-precedence-mapping <slot/port>

< slot/port > The interface number.

Default Setting

None

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Command Mode

Privileged EXEC, User EXEC

Display Message

The following information is repeated for each user priority.
IP Precedence The IP Precedence value.
Traffic Class The traffic class internal queue identifier to which the IP Precedence value is mapped.

5.14.1.3 **show queue trust**

This command displays the current trust mode setting for a specific interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the port trust mode of the interface is displayed. If omitted, the port trust mode of each interface in the system is shown. If the platform does not support independent per-port class of service mappings, the output represents the system-wide port trust mode used for all interfaces.

Syntax
show queue trust [<slot/port>]

< slot/port > The interface number.

Default Setting

None

Command Mode

Privileged EXEC, User EXEC

Display Message

Class of Service Trust Mode The trust mode of this interface.
Non-IP Traffic ClassThe traffic class used for non-IP traffic. This is only displayed when the COS trust mode is set to either 'trust ip-dscp' or 'trust ip-precedence'.
Untrusted Traffic Class The traffic class used for all untrusted traffic. This is only displayed when the COS trust mode is set to 'untrusted'.

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5.14.1.4 **show queue cos-queue**

This command displays the class-of-service queue configuration for the specified interface. The slot/port parameter is optional and is only valid on platforms that support independent per-port class of service mappings. If specified, the class-of-service queue configuration of the interface is displayed. If omitted, the most recent global configuration settings are displayed.

Syntax
show queue cos-queue [<slot/port>]

< slot/port > The interface number.

Default Setting

None

Command Mode

Privileged EXEC

Display Message

Interface This displays the slot/port of the interface. If displaying the global configuration, this output line is replaced with a Global Config indication.
Interface Shaping Rate The maximum transmission bandwidth limit for the interface as a whole. It is independent of any per-queue maximum bandwidth value(s) in effect for the interface. This is a configured value.

The following information is repeated for each queue on the interface.
Queue Id An interface supports n queues numbered 0 to (n-1). The specific n value is platform dependent.
Minimum Bandwidth The minimum transmission bandwidth guarantee for the queue, expressed as a percentage. A value of 0 means bandwidth is not guaranteed and the queue operates using best-effort. This is a configured value.
Scheduler Type Indicates whether this queue is scheduled for transmission using a strict priority or a weighted scheme. This is a configured value.
Queue Mgmt Type The queue depth management technique used for this queue, either tail drop or weighted random early discard (WRED). This is a configured value.

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5.14.2 *Configuration Commands*

5.14.2.1 **queue cos-map**

This command maps an 802.1p priority to an internal traffic class on a "per-port" basis.

Syntax
queue cos-map <0-7> <0-6>
no queue cos-map

< 0-7 > - The range of queue priority is 0 to 7.
< 0-6 > - The range of mapped traffic class is 0 to 6**.**
no - Reset to the default mapping of the queue priority and the mapped traffic class.

Default Setting

None

Command Mode

Interface Config.

This command maps an 802.1p priority to an internal traffic class for a device.

Syntax
queue cos-map all <0-7> <0-6>
no queue cos-map all

< 0-7 > - The range of queue priority is 0 to 7.
< 0-6 > - The range of mapped traffic class is 0 to 6**.**
no - Reset to the default mapping of the queue priority and the mapped traffic class.

Default Setting

None

Command Mode

Global Config.

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5.14.2.2 **queue ip-precedence-mapping**

This command maps an IP precedence value to an internal traffic class on a "per-port" basis.

Syntax
queue ip-precedence-mapping <0-7> <0-6> **no queue ip-precedence-mapping**

< 0-7 > - The range of IP precedence is 0 to 7.
< 0-6 > - The range of mapped traffic class is 0 to 6**.**
no - Reset to the default mapping of the IP precedence and the mapped traffic class.

Default Setting

None

Command Mode

Interface Config.

This command maps an IP precedence value to an internal traffic class for a device.

Syntax
queue ip-precedence-mapping all <0-7> <0-6> **no queue ip-precedence-mapping all**

< 0-7 > - The range of IP precedence is 0 to 7.
< 0-6 > - The range of mapped traffic class is 0 to 6**.**
no - Reset to the default mapping of the IP precedence and the mapped traffic class.

Default Setting

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None

Command Mode

Global Config.

5.14.2.3 **queue trust**

This command sets the class of service trust mode of an interface. The mode can be set to trust one of the Dot1p (802.1p), IP Precedence.

Syntax
queue trust {dot1p | ip-precedence | ip-dscp}
no queue trust

no - This command sets the interface mode to untrusted.

Default Setting

None

Command Mode

Interface Config.

This command sets the class of service trust mode for all interfaces. The mode can be set to trust one of the Dot1p (802.1p), IP Precedence.

Syntax
queue trust all {dot1p | ip-precedence | ip-dscp}
no queue trust all

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no - This command sets the class of service trust mode to untrusted for all interfaces.

Default Setting

None

Command Mode

Global Config.

5.14.2.4 queue cos-queue min-bandwidth

This command specifies the minimum transmission bandwidth guarantee for each interface queue.

Syntax
queue cos-queue min-bandwidth <bw-0> <bw-1> … <bw-6>
no queue cos-queue min-bandwidth

<bw-0> <bw-1> … <bw-6>- Each Valid range is (0 to 100) in increments of 5 and the total sum is less than or equal to 100.

no - This command restores the default for each queue's minimum bandwidth value.

Default Setting

None

Command Mode

Interface Config.

This command specifies the minimum transmission bandwidth guarantee for each interface queue in the device.

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Syntax
queue cos-queue min-bandwidth all <bw-0> <bw-1> … <bw-6>
no queue cos-queue min-bandwidth all

<bw-0> <bw-1> … <bw-6>- Each Valid range is (0 to 100) in increments of 5 and the total sum is less than or equal to 100.

no - This command restores the default for each queue's minimum bandwidth value in the device.

Default Setting

None

Command Mode

Global Config.

5.14.2.5 queue cos-queue strict

This command activates the strict priority scheduler mode for each specified queue on a "per-port" basis.

Syntax
queue cos-queue strict <queue-id-0> [<queue-id-1> … <queue-id-6>]
no queue cos-queue strict <queue-id-0> [<queue-id-1> … <queue-id-6>]

no - This command restores the default weighted scheduler mode for each specified queue on a "per-port" basis.

Default Setting

None

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Command Mode

Interface Config.

This command activates the strict priority scheduler mode for each specified queue on a device.

Syntax
queue cos-queue strict all <queue-id-0> [<queue-id-1> … <queue-id-6>]
no queue cos-queue strict all <queue-id-0> [<queue-id-1> … <queue-id-6>]

no - This command restores the default weighted scheduler mode for each specified queue on a device.

Default Setting

None

Command Mode

Global Config.

5.14.2.6 queue cos-queue traffic-shape

This command specifies the maximum transmission bandwidth limit for the interface as a whole. Also known as rate shaping, this has the effect of smoothing temporary traffic bursts over time so that the transmitted traffic rate is bounded.

Syntax
queue cos-queue traffic-shape <bw>
no queue cos-queue traffic-shape

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<bw> - Valid range is (0 to 100) in increments 5.

no - This command restores the default shaping rate value.

Default Setting

None

Command Mode

Interface Config.

This command specifies the maximum transmission bandwidth limit for all interfaces. Also known as rate shaping, this has the effect of smoothing temporary traffic bursts over time so that the transmitted traffic rate is bounded.

Syntax
queue cos-queue traffic-shape all <bw> **no queue cos-queue traffic-shape all**

<bw> - Valid range is (0 to 100) in increments 5.

no - This command restores the default shaping rate value for all interfaces.

Default Setting

None

Command Mode

Global Config.

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6 Routing Commands

VLAN Routing

You can configure the FortiSwitch-100 software with some ports supporting VLANs and some supporting routing. You can also configure the software to allow traffic on a VLAN to be treated as if the VLAN were a router port.

When a port is enabled for bridgin g (default) rather than routing, all normal bridge processing is performed for an inbound packet, which is then associated with a VLAN. Its MAC Destination Address (MAC DA) and VLAN ID are used to search the MAC address table. If routing is enabled for the VLAN and the MAC DA of an inbound unicast packet is that of the internal bridge-router interface, the packet will be routed. An inbound multicast packet will be forwarded to all ports in the VLAN, plus the internal bridge -router interface if it was received on a routed VLAN.

Since a port can be configured to belong to more than one VLAN, VLAN routing might be enabled for all of the VLANs on the port, or for a subset. VLAN Routing can be used to allow more than one physical port to reside on the same subne t. It could also be used when a VLAN spans multiple physical networks, or when additional segmentation or security is required. This section shows how to configure the FortiSwitch-100 software to support VLAN routing and how to use RIP and OSPF. A port can be either a VLAN port or a router port, but not both. However, a VLAN port may be part of a VLAN that is itself a router port.

VLAN Routing Configuration

This section provides an example of how to configure the FortiSwitch-100 software to support VLAN routing. The configuration of the VLAN router port is similar to that of a physical port. The main difference is that, after the VLAN has been created, you must use the show ip vlan command to determine the VLAN's interface ID so that you can use it in the router configuration commands.

CLI Examples

The diagram in this section shows a Layer 3 switch configured for port routing. It connects two VLANs, with two ports participating in one VLAN, and one port in the other. The script shows the commands you would use to configure the FortiSwitch-100 software to provide the VLAN routing support shown in the diagram.

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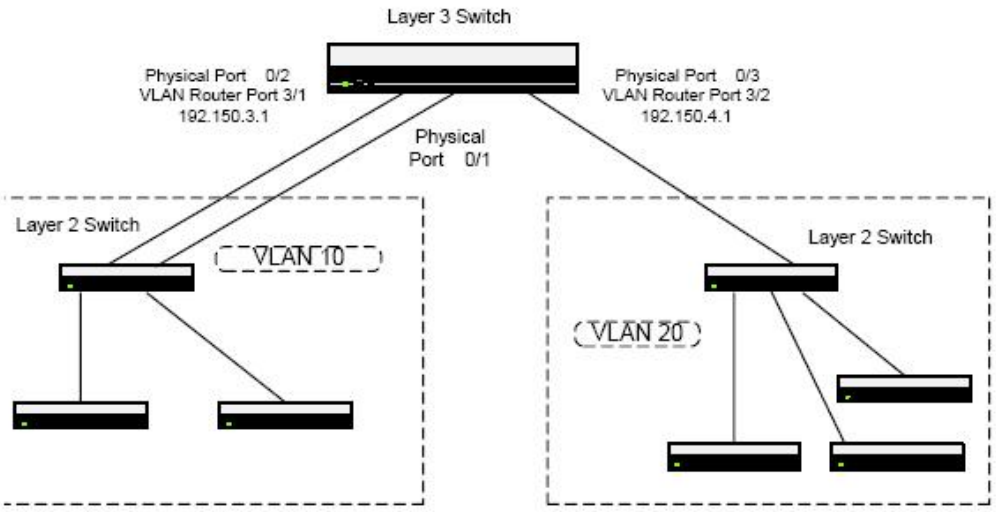
Figure 1. VLAN Routing Example Network Diagram



Step 1: Create Two VLANs

The following code sequence shows an example of creating two VLANs , and next specifies the VLAN ID assigned to untagged frames received on the ports.

```
config
vlan database
vlan 10
vlan 20
exit
config
interface 0/1
switchport allowed vlan add 10
switchport native vlan 10
switchport allowed vlan remove 1
exit
interface 0/2
switchport allowed vlan add 10
switchport native vlan 10
switchport allowed vlan remove 1
exit
interface 0/3
switchport allowed vlan add 20
switchport native vlan 20
switchport allowed vlan remove 1
exit
exit
```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Step 2: Set Up VLAN Routing for the VLANs and the Switch.

The following code sequence shows how to enable routing for the VLANs:

```
config
vlan database
vlan routing 10
vlan routing 20
exit
# show ip vlan
```

This returns the logical interface IDs that will be used instead of slot/port in subsequent routing commands. Assume that VLAN 10 is assigned ID 3/1 and VLAN 20 is assigned ID 3/2.

Enable routing for the switch:

config

ip routing

exit

The next sequence shows an example of configuring the IP addresses and subnet masks for the virtual router ports.

```
config
interface 3/1
ip address 192.150.3.1 255.255.255.0
exit
interface 3/2
ip address 192.150.4.1 255.255.255.0
exit
exit
```

Using the Web Interface to Configure VLAN Routing

Use the following screens to perform the same configuration using the Web Interface:

• Switching --> VLAN--> Configuration. To create the VLANs and specify port participation.

• Switching --> VLAN --> Port Configuration. To specify the handling of untagged frames on receipt, and whether frames will be transmitted tagged or untagged.

• Routing --> VLAN Routing --> Configuration. To enable VLAN routing and configure the ports.

• Routing --> IP --> Interface Configuration. To enable routing for the ports and configure their IP addresses and subnet masks. To enable routing for the switch.

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6.1 Address Resolution Protocol (ARP) Commands

6.1.1 *Show Commands*

6.1.1.1 **show ip arp**

This command displays the Address Resolution Protocol (ARP) cache.

Syntax
show ip arp

Default Setting

None

Command Mode

Privileged Exec

Display Message

Age Time: Is the time it takes for an ARP entry to age out. This value was configured into the unit. Age time is measured in seconds.
Response Time: Is the time it takes for an ARP request timeout. This value was configured into the unit. Response time is measured in seconds.
Retries: Is the maximum number of times an ARP request is retried. This value was configured into the unit.
Cache Size: Is the maximum number of entries in the ARP table. This value was configured into the unit.
Dynamic renew mode: Displays whether the ARP component automatically attempts to renew dynamic ARP entries when they aged out.
Total Entry Count Current/Peak: Field listing the total entries in the ARP table and the peak entry count in the ARP table.
Static Entry Count Configured/Active/Max: Field listing configured static entry count, active static entry count, and maximum static entry count in the ARP table.

The following are displayed for each ARP entry.
IP Address: Is the IP address of a device on a subnet attached to an existing routing interface.
MAC Address: Is the hardware MAC address of that device.
Interface: Is the routing slot/port associated with the device ARP entry
Type: Is the type that was configured into the unit. The possible values are Local, Gateway, Dynamic and Static.
Age: This field displays the current age of the ARP entry since last refresh (in hh:mm:ss format).

6.1.1.2 **show ip arp brief**

This command displays the brief Address Resolution Protocol (ARP) table information.

Syntax

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show ip arp brief

Default Setting

None

Command Mode

Privileged Exec

Display Message

Age Time: Is the time it takes for an ARP entry to age out. This value was configured into the unit. Age time is measured in seconds.
Response Time: Is the time it takes for an ARP request timeout. This value was configured into the unit. Response time is measured in seconds.
Retries: Is the maximum number of times an ARP request is retried. This value was configured into the unit.
Cache Size: Is the maximum number of entries in the ARP table. This value was configured into the unit.
Dynamic renew mode: Displays whether the ARP component automatically attempts to renew dynamic ARP entries when they aged out.
Total Entry Count Current/Peak: Field listing the total entries in the ARP table and the peak entry count in the ARP table.
Static Entry Count Configured/Active/Max: Field listing the configured static entry count, active static entry count, and maximum static entry count in the ARP table.

6.1.1.3 show ip arp static

This command displays the static Address Resolution Protocol (ARP) table information.

Syntax
show ip arp static

Default Setting

None

Command Mode

Privileged Exec

Display Message

IP address: Is the IP address of a device on a subnet attached to an existing routing interface.
MAC address: Is the MAC address for that device.

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6.1.2 *Configuration Commands*

6.1.2.1 **arp**

This command creates an ARP entry. The value for <ipaddress> is the IP address of a device on a subnet attached to an existing routing interface. The value for <macaddress> is a unicast MAC address for that device.

Syntax
arp <ipaddr> <macaddr>
no arp <ipaddr> <macaddr>

<ipaddr> - Is the IP address of a device on a subnet attached to an existing routing interface.

<macaddr> - Is a MAC address for that device. The format is 6 two-digit hexadecimal numbers that are separated by colons, for example, 00:06:29:32:81:40.

no - This command deletes an ARP entry.

Default Setting

None

Command Mode

Global Config

6.1.2.2 **ip proxy-arp**

This command enables proxy ARP on a router interface. Without proxy ARP, a device only responds to an ARP request if the target IP address is an address configured on the interface where the ARP request arrived. With proxy ARP, the device may also respond if the target IP address is reachable. The device only responds if all next hops in its route to the destination are through interfaces other than the interface that received the ARP request.

Syntax
ip proxy-arp
no ip proxy-arp

no - This command disables proxy ARP on a router interface.

Default Setting

Enabled

Command Mode

Interface Config

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6.1.2.3 **arp cachesize**

This command configures the maximum number of entries in the ARP cache.

Syntax
arp cachesize <256-1920> **no arp cachesize**

<256-1920> - The range of cache size is 256 to 1920.

no - This command configures the default ARP cache size.

Default Setting

The default cache size is 1920.

Command Mode

Global Config

6.1.2.4 **arp dynamicrenew**

This command enables ARP component to automatically renew ARP entries of type dynamic when they age out.

Syntax
arp dynamicrenew **no arp dynamicrenew**

no - This command disables ARP component from automatically renewing ARP entries of type dynamic when they age out.

Default Setting

Enabled

Command Mode

Global Config

6.1.2.5 **arp purge**

This command causes the specified IP address to be removed from the ARP table. Only entries of type dynamic or gateway are affected by this command.

Syntax
arp purge <ipaddr>

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<ipaddr> - The IP address to be removed from the ARP table.

Default Setting

None

Command Mode

Privileged Exec

6.1.2.6 arp resptime

This command configures the ARP request response timeout.

Syntax
arp resptime <1-10>
no arp resptime

<1-10> - The range of default response time is 1 to 10 seconds.

no - This command configures the default response timeout time.

Default Setting

The default response time is 1.

Command Mode

Global Config

6.1.2.7 arp retries

This command configures the ARP count of maximum request for retries.

Syntax
arp retries <0-10>
no arp retries

<0-10> - The range of maximum request for retries is 0 to 10.

no - This command configures the default count of maximum request for retries.

Default Setting

The default value is 4.

Command Mode

Global Config

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6.1.2.8 arp timeout

This command configures the ARP entry ageout time.

Syntax
arp timeout <15-21600> **no arp timeout**

<15-21600> - Represents the IP ARP entry ageout time in seconds. The range is 15 to 21600 seconds.

no - This command configures the default ageout time for IP ARP entry.

Default Setting

The default value is 1200.

Command Mode

Global Config

6.1.2.9 clear arp-cache

This command causes all ARP entries of type dynamic to be removed form the ARP cache. If the [gateway] parameter is specified, the dynamic entries of type gateway are purged as well.

Syntax
clear ip arp-cache [gateway | interface <slot/port>]

Default Setting

None

Command Mode

Privileged Exec

6.2 IP Routing Commands

6.2.1 *Show Commands*

6.2.1.1 show ip brief

This command displays all the summary information of the IP.

Syntax

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show ip brief

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

Default Time to Live: The computed TTL (Time to Live) of forwarding a packet from the local router to the final destination.

Routing Mode: Show whether the routing mode is enabled or disabled.

IP Forwarding Mode: Disable or enable the forwarding of IP frames.

Maximum Next Hops: The maximum number of hops supported by this switch.

6.2.1.2 show ip interface port

This command displays all pertinent information about the IP interfaces.

Syntax
show ip interface port <slot/port>

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

IP Address: Is an IP address representing the subnet configuration of the router interface.

Subnet Mask: Is a mask of the network and host portion of the IP address for the router interface.

Routing Mode: Is the administrative mode of router interface participation. The possible values are enable or disable.

Administrative Mode Is the administrative mode of the specified interface. The possible values of this field are enable or disable. This value was configured into the unit.

Forward Net Directed Broadcasts: Displays whether forwarding of network-directed broadcasts is enabled or disabled.

Active State: Displays whether the interface is active or inactive. An interface is considered active if its link is up and it is in forwarding state.

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Link Speed Data Rate: Is an integer representing the physical link data rate of the specified interface. This is measured in Megabits per second (Mbps).

MAC Address: Is the physical address of the specified interface.

Encapsulation Type: Is the encapsulation type for the specified interface.

IP Mtu: Is the Maximum Transmission Unit size of the IP packet.

6.2.1.3 **show ip interface brief**

This command displays summary information about IP configuration settings for all ports in the router.

Syntax
show ip interface brief

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

Interface: Valid slot and port number separated by a forward slash.
IP Address: The IP address of the routing interface.

IP Mask: The IP mask of the routing interface.

Netdir Bcast: Indicates if IP forwards net-directed broadcasts on this interface. Possible values are Enable or Disable.

MultiCast Fwd: Indicates the multicast forwarding administrative mode on the interface. Possible values are Enable or Disable.

6.2.1.4 **show ip route**

This command displays the entire route table.

Syntax
show ip route

Default Setting

None

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Command Mode

Privileged Exec

Display Message

Total Number of Routes: The total number of routes.

for each next hop

Network Address: Is an IP address identifying the network on the specified interface.
Subnet Mask: Is a mask of the network and host portion of the IP address for the router interface.

Protocol: Tells which protocol added the specified route. The possibilities are: local, static, OSPF, or RIP

Next Hop Intf: The outgoing router interface to use when forwarding traffic to the next destination.

Next Hop IP Address: The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination.

6.2.1.5 **show ip route bestroutes**

This command displays router route table information for the best routes.

Syntax
show ip route bestroutes

Default Setting

None

Command Mode

Privileged Exec

Display Message

Total Number of Routes: The total number of routes.

Network Address: Is an IP route prefix for the destination.
Subnet Mask: Is a mask of the network and host portion of the IP address for the router interface.

Protocol: Tells which protocol added the specified route. The possibilities are: local, static, OSPF, or RIP.

for each next hop

Next Hop Intf: The outgoing router interface to use when forwarding traffic to the next destination.

Next Hop IP Address: The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination.

6.2.1.6 **show ip route entry**

This command displays the router route entry information.

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Syntax

show ip route entry <networkaddress>

<networkaddress> - Is a valid network address identifying the network on the specified interface.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Network Address: Is a valid network address identifying the network on the specified interface.

Subnet Mask: Is a mask of the network and host portion of the IP address for the attached network.

Protocol: Tells which protocol added the specified route. The possibilities are: local, static, OSPF, or RIP.

Total Number of Routes: The total number of routes.

for each next hop

Next Hop Intf: The outgoing router interface to use when forwarding traffic to the next destination.

Next Hop IP Address: The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path toward the destination.

Preference: The preference value that is used for this route entry.

Metric: Specifies the metric for this route entry.

6.2.1.7 **show ip route precedence**

This command displays detailed information about the route preferences. Route preferences are used in determining the best route. Lower router preference values are preferred over higher router preference values.

Syntax

show ip route preferences

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

Local: This field displays the local route preference value.

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Static: This field displays the static route preference value.

OSPF Intra: This field displays the OSPF intra route preference value.

OSPF Inter: This field displays the OSPF inter route preference value.

OSPF Ext T1: This field displays the OSPF Type-1 route preference value.

OSPF Ext T2: This field displays the OSPF Type-2 route preference value.

RIP: This field displays the RIP route preference value.

6.2.1.8 **show ip traffic**

This command displays IP statistical information. Refer to RFC 1213 for more information about the fields that are displayed.

Syntax
show ip traffic

Default Setting

None

Command Mode

Privileged Exec, User Exec

6.2.2 *Configuration Commands*

6.2.2.1 **routing**

This command enables routing for an interface.

Syntax
routing
no routing

no - Disable routing for an interface.

Default Setting

Enabled

Command Mode

Interface Config

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6.2.2.2 ip routing

This command enables the IP Router Admin Mode for the master switch.

Syntax
ip routing
no ip routing

no - Disable the IP Router Admin Mode for the master switch.

Default Setting

Enabled

Command Mode

Global Config

6.2.2.3 ip address

This command configures an IP address on an interface. The IP address may be a secondary IP address.

Syntax
ip address <ipaddr> <subnet-mask> [secondary]
no ip address <ipaddr> <subnet-mask> [secondary]

<ipaddr> - IP address of the interface.

<subnet-mask> - Subnet mask of the interface.

[secondary] - It is a secondary IP address.

no - Delete an IP address from an interface.

Default Setting

None

Command Mode

Interface Config

6.2.2.4 ip route

This command configures a static route.

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Syntax

ip route <networkaddr> <subnetmask> [<nexthopip> [<1-255 >]]

no ip route <networkaddr> <subnetmask> [{ <nexthopip> | <1-255 > }]

<ipaddr> - A valid IP address .

<subnetmask> - A valid subnet mask.

<nexthopip> - IP address of the next hop router.

<1-255> - The precedence value of this route. The range is 1 to 255.

no - delete all next hops to a destination static route. If the optional <nextHopRtr> parameter is designated, the next hop is deleted and if the optional precedence value is designated, the precedence value of the static route is reset to its default value 1.

Default Setting

None

Command Mode

Global Config

6.2.2.5 ip route default-next-hop

This command configures the default route.

Syntax

ip route default-next-hop <nexthopip> [1-255]

<nexthopip> - IP address of the next hop router.

<1-255> - Precedence value of this route.

Default Setting

None

Command Mode

Global Config

6.2.2.6 ip route precedence

This command sets the default precedence for static routes. Lower route preference values are preferred when determining the best route. The "ip route" and "ip default-next-hop" commands allow you to optionally set the precedence of an individual static route. The default precedence is used when no precedence is specified in these commands. Changing

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the default precedence does not update the precedence of existing static routes, even if they were assigned the original default precedence. The new default precedence will only be applied to static routes created after invoking the "ip route precedence" command.

Syntax
ip route precedence <1-255>

<1-255> - Default precedence value of static routes. The range is 1 to 255.

Default Setting

The default precedence value is 1.

Command Mode

Global Config

6.2.2.7 ip forwarding

This command enables forwarding of IP frames.

Syntax
ip forwarding
no ip forwarding

no - Disable forwarding of IP frames.

Default Setting

Enabled

Command Mode

Global Config

6.2.2.8 ip directed-broadcast

This command enables the forwarding of network-directed broadcasts. When enabled, network directed broadcasts are forwarded. When disabled they are dropped.

Syntax
ip directed-broadcast

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no ip directed-broadcast

no - Drop network directed broadcast packets.

Default Setting

Enabled

Command Mode

Interface Config

6.2.2.9 ip mtu

This command sets the IP Maximum Transmission Unit (MTU) on a routing interface. The IP MTU is the size of the largest IP packet that can be transmitted on the interface without fragmentation.

Syntax
ip mtu <68-1500>
no ip mtu <68-1500>

<68-1500> - The IP MTU on a routing interface. The range is 68 to 1500.

no - Reset the ip mtu to the default value.

Default Setting

The default value is 1500.

Command Mode

Interface Config

6.2.2.10 encapsulation

This command configures the link layer encapsulation type for the packet.

Syntax
encapsulation {ethernet | snap}

ethernet - The link layer encapsulation type is ethernet.

snap - The link layer encapsulation type is SNAP.

Default Setting

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The default value is ethernet.

Command Mode

Interface Config

Restrictions

Routed frames are always Ethernet encapsulated when a frame is routed to a VLAN.

6.3 Open Shortest Path First (OSPF) Commands

6.3.1 *Show Commands*

6.3.1.1 **show ip ospf**

This command displays information relevant to the OSPF router

Syntax
show ip ospf

Default Setting

None

Command Mode

Privileged Exec

Display Messages

Router ID Is a 32 bit integer in dotted decimal format identifying the router.
OSPF Admin Mode The administrative mode of OSPF in the router.
ASBR Mode Reflects whether the ASBR mode is enabled or disabled. Enable implies that the router is an autonomous system border router. Router automatically becomes an ASBR when it is configured to redistribute routes learned from other protocol. The possible
values for the ASBR status is enabled (if the router is configured to re-distribute routes learnt by other protocols) or disabled (if the router is not configured for the same).
RFC 1583 Compatibility Reflects whether 1583 compatibility is enabled or disabled. This is a configured value.
ABR Status Reflects the whether or not the router is an OSPF Area Border Router.
Exit Overflow Interval The number of seconds that, after entering OverflowState, a router will attempt to leave OverflowState.
External LSA count The number of external (LS type 5) link-state advertisements in the link-state database.

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External LSA Checksum A number which represents the sum of the LS checksums of external link-state advertisements contained in the link-state database.
New LSAs Originated The number of new link-state advertisements that have been originated.
LSAs Received The number of link-state advertisements received determined to be new instantiations.
External LSDB Limit The maximum number of non-default AS-external-LSAs entries that can be stored in the link-state database.
Default-metric RDefault value for redistributed routes.
Default Route Advertise Enable or Disable Default Route Advertise.
Always Sets the router advertise 0.0.0.0/0.0.0.0 when set to "True".
Metric Specifies the metric of the default route. The valid values are (0 to 16777215).
Metric Type Metric type of the default route. The valid values are External Type 1 and External Type 2.
Maximum Paths Maximum number of paths that OSPF can report for a given destination.

6.3.1.2 **show ip ospf area**

This command displays information relevant to the OSPF router

Syntax
show ip ospf area <areaid>

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

AreaID Is the area id of the requested OSPF area.
Aging Interval Is a number representing the aging interval for this area.
External Routing Is a number representing the external routing capabilities for this area.
Spf Runs Is the number of times that the intra-area route table has been calculated using this area's link-state database.
Area Border Router Count The total number of area border routers reachable within this area.
Area LSA Count Total number of link-state advertisements in this area's link-state database, excluding AS external LSA's.
Area LSA Checksum A number representing the area LSA checksum for the specified AreaID excluding the external (LS type 5) link-state advertisements.
Stub Mode Represents whether the specified Area is a stub area or not. The possible values are enabled and disabled. This is a configured value.
Import Summary LSAs Enable to import LSAs into stub area.

6.3.1.3 **show ip ospf database**

This command displays the link state database. This command takes no options. The information will only be displayed if OSPF is enabled.

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Syntax
show ip ospf database

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

Router ID Is a 32 bit dotted decimal number representing the LSDB interface.
Area ID Is the IP address identifying the router ID.
LSA Type The types are: router, network, ipnet sum, asbr sum, as external, group member, tmp 1, tmp 2, opaque link, opaque area.
LS ID Is a number that "uniquely identifies an LSA that a router originates from all other self originated LSA's of the same LS type."
Age Is a number representing the age of the link state advertisement in seconds.
Sequence Is a number that represents which LSA is more recent.
Checksum Is to total number LSA checksum.
Options This is an integer. It indicates that the LSA receives special handling during routing calculations.

6.3.1.4 **show ip ospf interface**

This command displays the information for the IFO object or virtual interface tables.

Syntax
show ip ospf interface <slot/port>

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

IP Address Represents the IP address for the specified interface. This is a configured value.
Subnet Mask Is a mask of the network and host portion of the IP address for the OSPF interface. This value was configured into the unit. This is a configured value.
OSPF Admin Mode States whether OSPF is enabled or disabled on a router interface. This is a configured value.
OSPF Area ID Represents the OSPF Area Id for the specified interface. This is a configured value.

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Router Priority A number representing the OSPF Priority for the specified interface. This is a configured value.
Retransmit Interval A number representing the OSPF Retransmit Interval for the specified interface. This is a configured value.
Hello Interval A number representing the OSPF Hello Interval for the specified interface. This is a configured value.
Dead Interval A number representing the OSPF Dead Interval for the specified interface. This is a configured value.
LSA Ack Interval A number representing the OSPF LSA Acknowledgement Interval for the specified interface.
IfTransit Delay Interval A number representing the OSPF Transit Delay for the specified interface. This is a configured value.
Authentication Type The OSPF Authentication Type for the specified interface are: none, simple, and encrypt. This is a configured value.
Metric Cost Is the cost of the ospf interface. This is a configured value.
OSPF Mtu-ignore Disables OSPF MTU mismatch detection on receiving packets. Default value is Disable.

6.3.1.5 **show ip ospf interface brief**

This command displays brief information for the IFO object or virtual interface tables.

Syntax
show ip ospf interface brief

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

Interface Valid slot and port number separated by a forward slash.
Admin Mode States whether OSPF is enabled or disabled on a router interface. This is a configured value.
Area ID Represents the OSPF Area Id for the specified interface. This is a configured value.
Router Priority A number representing the OSPF Priority for the specified interface. This is a configured value.
Hello Interval A number representing the OSPF Hello Interval for the specified interface. This is a configured value.
Dead Interval A number representing the OSPF Dead Interval for the specified interface. This is a configured value.
Retrax Interval A number representing the OSPF Retransmit Interval for the specified interface. This is a configured value.
Retrax Delay A number representing the OSPF Transit Delay for the specified interface. This is a configured value.
LSAAck Interval A number representing the OSPF LSA Acknowledgement Interval for the specified interface.

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6.3.1.6 **show ip ospf interface stats**

This command displays the statistics for a specific interface.

Syntax
show ip ospf interface stats <slot/port>

<slot/port> - Interface number.

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

OSPF Area ID The area id of this OSPF interface.
Spf Runs The number of times that the intra-area route table has been calculated using this area's link-state database.
Area Border Router Count The total number of area border routers reachable within this area. This is initially zero, and is calculated in each SPF pass.
AS Border Router Count The total number of Autonomous System border routers reachable within this area.
Area LSA Count The total number of link-state advertisements in this area's link-state database, excluding AS External LSAs.
IP Address The IP address associated with this OSPF interface.
OSPF Interface Events The number of times the specified OSPF interface has changed its state, or an error has occurred.
Virtual Events The number of state changes or errors that occurred on this virtual link.
Neighbor Events The number of times this neighbor relationship has changed state, or an error has occurred.
External LSA Count The number of external (LS type 5) link-state advertisements in the link-state database.
LSAs Received The number of LSAs received.
Originate New LSAs The number of LSAs originated.

6.3.1.7 **show ip ospf neighbor**

This command displays the OSPF neighbor table list. When a particular neighbor ID is specified, detailed information about a neighbor is given. The information will only be displayed if OSPF is enabled and the interface has a neighbor.

Syntax
show ip ospf neighbor <ipaddr> <slot/port>

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<ipaddr> - IP address of the neighbor.
<slot/port> - Interface number.

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

Interface Is the interface number.

Router Id Is a 4-digit dotted-decimal number identifying neighbor router.
Options An integer value that indicates the optional OSPF capabilities supported by the neighbor. The neighbor's optional OSPF capabilities are also listed in its Hello packets.
This enables received Hello Packets to be rejected (i.e., neighbor relationships will not even start to form) if there is a mismatch in certain crucial OSPF capabilities.
Router Priority Displays the OSPF priority for the specified interface. The priority of an interface is a priority integer from 0 to 255. A value of '0' indicates that the router is not eligible to become the designated router on this network.
State The types are:
Down- initial state of the neighbor conversation - no recent information has been received from the neighbor.
Attempt - no recent information has been received from the neighbor but a more concerted effort should be made to contact the neighbor.
Init - an Hello packet has recently been seen from the neighbor, but bi-directional communication has not yet been established.
2 way - communication between the two routers is bi-directional.
Exchange start - the first step in creating an adjacency between the two neighboring routers, the goal is to decide which router is the master and to decide upon the initial DD sequence number.
Exchange - the router is describing its entire link state database by sending Database Description packets to the neighbor.
Loading - Link State Request packets are sent to the neighbor asking for the more recent LSAs that have been discovered (but not yet received) in the Exchange state.
Full - the neighboring routers are fully adjacent and they will now appear in router-LSAs and network-LSAs.
Events The number of times this neighbor relationship has changed state, or an error has occurred.
Permanence This variable displays the status of the entry, either dynamic or permanent. This refers to how the neighbor became known.
Hellos Suppressed This indicates whether Hellos are being suppressed to the neighbor. The types are enabled and disabled.
Retransmission Queue Length Is an integer representing the current length of the retransmission queue of the specified neighbor router Id of the specified interface.

6.3.1.8 **show ip ospf neighbor brief**

This command displays the OSPF neighbor table list. When a particular neighbor ID is specified, detailed information about a neighbor is given. The information will only be displayed if OSPF is enabled.

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Syntax

show ip ospf neighbor brief {<slot/port> | all}

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

Router ID A 4 digit dotted decimal number representing the neighbor interface.
IP Address An IP address representing the neighbor interface.
Neighbor Interface Index Is a slot/port identifying the neighbor interface index.
State The types are:
Down- initial state of the neighbor conversation - no recent information has been received from the neighbor.
Attempt - no recent information has been received from the neighbor but a more concerted effort should be made to contact the neighbor.
Init - an Hello packet has recently been seen from the neighbor, but bi-directional communication has not yet been established.
2 way - communication between the two routers is bi-directional.
Exchange start - the first step in creating an adjacency between the two neighboring routers, the goal is to decide which router is the master and to decide upon the initial DD sequence number.
Exchange - the router is describing its entire link state database by sending Database Description packets to the neighbor.
Loading - Link State Request packets are sent to the neighbor asking for the more recent LSAs that have been discovered (but not yet received) in the Exchange state.
Full - the neighboring routers are fully adjacent and they will now appear in router-LSAs and network-LSAs.

6.3.1.9 **show ip ospf range**

This command displays information about the area ranges for the specified <areaid>. The <areaid> identifies the OSPF area whose ranges are being displayed.

Syntax

show ip ospf range <areaid>

<areaid> - The area id of the requested OSPF area

Default Setting

None

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Command Mode

Privileged Exec, User Exec

Display Messages

Area ID The area id of the requested OSPF area.
IP Address An IP Address which represents this area range.
Subnet Mask A valid subnet mask for this area range.
Lsdb Type The type of link advertisement associated with this area range.
Advertisement The status of the advertisement. Advertisement has two possible settings: enabled or disabled.

6.3.1.10 **show ip ospf stub table**

This command displays the OSPF stub table. The information will only be displayed if OSPF is initialized on the switch.

Syntax
show ip ospf stub table

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

Area ID Is a 32-bit identifier for the created stub area.
Type of Service Is the type of service associated with the stub metric. FASTPATH only supports Normal TOS.
Metric Val The metric value is applied based on the TOS. It defaults to the least metric of the type of service among the interfaces to other areas. The OSPF cost for a route is a function of the metric value.
Metric Type Is the type of metric advertised as the default route.
Import Summary LSA Controls the import of summary LSAs into stub areas.

6.3.1.11 **show ip ospf virtual-link**

This command displays the OSPF Virtual Interface information for a specific area and neighbor.

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Syntax
show ip ospf virtual-link <areaid> <neighbor>

<areaid> - Area ID.
<neighbor> - Neighbor's router ID.

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

Area ID The area id of the requested OSPF area.
Neighbor Router ID The input neighbor Router ID.
Hello Interval The configured hello interval for the OSPF virtual interface.
Dead Interval The configured dead interval for the OSPF virtual interface.
Iftransit Delay Interval The configured transit delay for the OSPF virtual interface.
Retransmit Interval The configured retransmit interval for the OSPF virtual interface.
State The OSPF Interface States are: down, loopback, waiting, point-to-point, designated router, and backup designated router. This is the state of the OSPF interface.
Metric The metric value.
Neighbor State The neighbor state.
Authentication Type The configured authentication type of the OSPF virtual interface.

6.3.1.12 **show ip ospf virtual-link brief**

This command displays the OSPF Virtual Interface information for all areas in the system.

Syntax
show ip ospf virtual-link brief

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Messages

Area Id Is the area id of the requested OSPF area.

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Neighbor Is the neighbor interface of the OSPF virtual interface.
Hello Interval Is the configured hello interval for the OSPF virtual interface.
Dead Interval Is the configured dead interval for the OSPF virtual interface.
Retransmit Interval Is the configured retransmit interval for the OSPF virtual interface.
Transit Delay Is the configured transit delay for the OSPF virtual interface.

6.3.2 *Configuration Commands*

6.3.2.1 **enable**

This command resets the default administrative mode of OSPF in the router to active.

Syntax
enable
no enable

<no> - This command sets the administrative mode of OSPF in the router to inactive.

Default Setting

Enabled

Command Mode

Router OSPF Config

6.3.2.2 **no area**

This command removes an OSPF area.

Syntax
no area <areaid>

Default Setting

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None

Command Mode

Router OSPF Config

6.3.2.3 ip ospf

This command enables OSPF on a router interface.

Syntax
ip ospf
no ip ospf

<no> - This command disables OSPF on a router interface.

Default Setting

Disabled

Command Mode

Interface Config

6.3.2.4 1583compatibility

This command enables OSPF 1583 compatibility. Note that if all OSPF routers in the routing domain are capable of operating according to RFC 2328, OSPF 1583 compatibility mode should be disabled.

Syntax
1583compatibility
no 1583compatibility

<no> - This command disables OSPF 1583 compatibility.

Default Setting

Enabled

Command Mode

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Router OSPF Config

6.3.2.5 **area default-cost**

This command configures the monetary default cost for the stub area.

Syntax
area <areaid> default-cost <1-16777215>

<areaid> - Area ID
<1-16777215> - The default cost value. The range is 1 to 16777215.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.6 **area nssa**

This command configures the specified areaid to function as an NSSA.

Syntax
area <areaid> nssa
no area <areaid> nssa

<areaid> - Area ID.
<no> - This command disables nssa from the specified area id.

Default Setting

None

Command Mode

Router OSPF Config

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6.3.2.7 area nssa default-info-originate

This command configures the metric value and type for the default route advertised into the NSSA.

Syntax

area <areaid> nssa default-info-originate [<1-16777215>] [{comparable | non-comparable}]

<areaid> - Area ID.
<1-16777215> - The metric of the default route. The range is 1 to 16777215.
comparable - It's NSSA-External 1.
non-comparable - It's NSSA-External 2.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.8 area nssa no-redistribute

This command configures the NSSA ABR so that learned external routes will not be redistributed to the NSSA.

Syntax

area <areaid> nssa no-redistribute

<areaid> - Area ID.

Default Setting

None

Command Mode

Router OSPF Config

Downloaded from www.Manualslib.com manuals search engine

6.3.2.9 **area nssa no-summary**

This command configures the NSSA so that summary LSAs are not advertised into the NSSA

Syntax
area <areaid> nssa no- summary

<areaid> - Area ID.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.10 **area nssa translator-role**

This command configures the translator role of the NSSA.

Syntax
area <areaid> nssa translator-role {always | candidate}

<areaid> - Area ID.
always - A value of *always* will cause the router to assume the role of the translator when it becomes a border router.
candidate - a value of *candidate* will cause the router to participate in the translator election process when it attains border router status.

Default Setting

None

Command Mode

Router OSPF Config

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6.3.2.11 **area nssa translator-stab-intv**

This command configures the translator stability interval of the NSSA. The <stabilityinterval> is the period of time that an elected translator continues to perform its duties after it determines that its translator status has been deposed by another router.

Syntax
area <areaid> nssa translator-stab-intv <0-3600>

<areaid> - Area ID.
<0-3600> - The range is 0 to 3600.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.12 **area range**

This command creates a specified area range for a specified NSSA.

Syntax
area <areaid> range <ipaddr> <subnetmask> {summarylink | nssaexternallink} [advertise | not-advertise] **no area <areaid> range <ipaddr> <subnetmask>**

<areaid> - Area ID.
<ipaddr> - IP Address.
<subnetmask> - The subnetmask.
summarylink - The lsdb type. The value is summarylink or nssaexternallink
nssaexternallink - The lsdb type. The value is summarylink or nssaexternallink
advertise - Allow advertising the specified area range.
not-advertise - Disallow advertising the specified area range.
<no> - This command deletes a specified area range.

Default Setting

None

Command Mode

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Router OSPF Config

6.3.2.13 **area stub**

This command creates a stub area for the specified area ID. A stub area is characterized by the fact that AS External LSAs are not propagated into the area. Removing AS External LSAs and Summary LSAs can significantly reduce the link state database of routers within the stub area.

Syntax
area <areaid> stub
no area <areaid> stub

<areaid> - Area ID.
<no> - This command deletes a stub area for the specified area ID.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.14 **area stub summarylsa**

This command configures the Summary LSA mode for the stub area identified by <areaid>. The Summary LSA mode is configured as enabled.

Syntax
area <areaid> stub summarylsa
no area <areaid> stub summarylsa

<areaid> - Area ID.
<no> - This command configures the default Summary LSA mode for the specified stub area.

Default Setting

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Disabled

Command Mode

Router OSPF Config

6.3.2.15 area virtual-link authentication

This command configures the authentication type and key for the OSPF virtual interface identified by <areaid> and <neighborid>.

Syntax
area <areaid> virtual-link <neighborid> authentication [{none | {simple <key>} | {encrypt <key> <0-255>}}]
no area <areaid> virtual-link <neighborid> authentication

<areaid> - Area ID.
<neighbor> - Router ID of the neighbor.
none - No authentication.
<key> - The [key] is composed of standard displayable, non-control keystrokes from a standard 101/102-key keyboard. The authentication key must be 8 bytes or less if the authentication type is simple. If the type is encrypt, the key may be up to 256 bytes. Unauthenticated interfaces do not need an authentication key.
<0-255> - Specifies the Key ID. The range is 0 to 255.
<no> - This command configures the default authentication type for the OSPF virtual interface identified by <areaid> and <neighborid>.

Default Setting

The default authentication type is none.

Command Mode

Router OSPF Config

6.3.2.16 area virtual-link dead-interval

This command configures the dead interval for the OSPF virtual interface on the virtual interface identified by **<**areaid**>** and **<**neighborid**>**.

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Syntax

area <areaid> virtual-link <neighborid> dead-interval <1-65535>

no area <areaid> virtual-link <neighborid> dead-interval

<areaid> - Area ID.
<neighbor> - Router ID of the neighbor.
<1-65535> - The range of the dead interval is 1 to 65535.
<no> - This command deletes the OSPF virtual interface from the given interface, identified by <areaid> and <neighborid>.

Default Setting

The default value of dead interval is 40 seconds.

Command Mode

Router OSPF Config

6.3.2.17 area virtual-link hello-interval

This command configures the hello interval for the OSPF virtual interface on the interface identified by **<**areaid**>** and **<**neighborid**>**.

Syntax

area <areaid> virtual-link <neighborid> hello-interval <1-65535>

no area <areaid> virtual-link <neighborid> hello-interval

<areaid> - Area ID.
<neighborid> - Router ID of the neighbor.
<1-65535> - The range of the hello interval is 1 to 65535.
<no> - This command configures the default hello interval for the OSPF virtual interface on the interface identified by <areaid> and <neighborid>.

Default Setting

The default value of hello interval is 10 seconds.

Command Mode

Router OSPF Config

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6.3.2.18 area virtual-link retransmit-interval

This command configures the retransmit interval for the OSPF virtual interface on the interface identified by **<**areaid**>** and **<**neighborid**>**.

Syntax
area <areaid> virtual-link <neighborid> retransmit-interval <0-3600>
no area <areaid> virtual-link <neighborid> retransmit-interval

<areaid> - Area ID.
<neighborid> - Router ID of the neighbor.
<0-3600> - The range of the retransmit interval is 0 to 3600.
<no> - This command configures the default retransmit interval for the OSPF virtual interface on the interface identified by <areaid> and <neighborid>.

Default Setting

The default value of retransmit interval is 5 seconds.

Command Mode

Router OSPF Config

6.3.2.19 area virtual-link transmit-delay

This command configures the transmit delay for the OSPF virtual interface on the virtual interface identified by <areaid> and <neighborid>.

Syntax
area <areaid> virtual-link <neighborid> transmit-delay <0-3600>
no area <areaid> virtual-link <neighborid> transmit-delay

<areaid> - Area ID.
<neighbor> - Router ID of the neighbor.
<0-3600> - The range of the transmit delay is 0 to 3600.
<no> - This command configures the default transmit delay for the OSPF virtual interface on the virtual interface identified by <areaid> and <neighborid>.

Default Setting

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The default value of hello interval is 1 second.

Command Mode

Router OSPF Config

6.3.2.20 default-information originate

This command is used to control the advertisement of default routes.

Syntax
default-information originate [always] [metric <1-16777215>] [metric-type {1 | 2}]
no default-information originate [metric] [metric-type]

[always] - Sets the router advertise 0.0.0.0/0.0.0.0.
metric - The range of the metric is 1 to 16777215.
metric type - The value of metric type is type 1 or type 2.
<no> - This command configures the default advertisement of default routes.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.21 default-metric

This command is used to set a default for the metric of distributed routes.

Syntax
default-metric <1-16777215>
no default-metric

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<1-16777215> - The range of default metric is 1 to 16777215.
<no> - This command configures the default advertisement of default routes.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.22 distance ospf

This command sets the route preference value of OSPF in the router. Lower route preference values are preferred when determining the best route. The type of OSPF can be intra, inter, type-1, or type-2. The OSPF specification (RFC 2328) requires that preferences must be given to the routes learned via OSPF in the following order: intra < inter < type-1 < type-2.

Syntax
distance ospf {intra | inter | type1 | type2} [<preference>]
no distance ospf {intra | inter | type1 | type2}

<preference> - The range for intra is 1 to 252. The range for inter is 2 to 253. The range for type1 is 3 to 254. The range for type2 is 4 to 255.
<no> - This command sets the default route preference value of OSPF in the router.

Default Setting

The default preference value for intra is 8. The default preference value for inter is 10. The default preference value for type 1 is 13. The default preference value for type 2 is 150.

Command Mode

Router OSPF Config

6.3.2.23 distribute-list out

This command is used to specify the access list to filter routes received from the source protocol.

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Syntax
distribute-list <1-199> out {rip | static | connected} **no distribute-list <1-199> out {rip | static | connected}**

<1-199> - The range of default list id is 1 to 199.
<no> - This command is used to specify the access list to filter routes received from the source protocol.

Default Setting

None

Command Mode

Router OSPF Config

6.3.2.24 exit-overflow-interval

This command configures the exit overflow interval for OSPF. It describes the number of seconds after entering Overflow state that a router will wait before attempting to leave the Overflow State. This allows the router to again originate non-default AS-external-LSAs. When set to 0, the router will not leave Overflow State until restarted.

Syntax
exit-overflow-interval <0-2147483647> **no exit-overflow-interval**

<0-2147483674> - The range of exit overflow interval for OSPF is 0 to 2147483674.
<no> - This command configures the default exit overflow interval for OSPF.

Default Setting

The default value of exit overflow interval for OSPF is 0.

Command Mode

Router OSPF Config

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6.3.2.25 **external-lsdb-limit**

This command configures the external LSDB limit for OSPF. If the value is -1, then there is no limit. When the number of non-default AS-external-LSAs in a router's link-state database reaches the external LSDB limit, the router enters overflow state. The router never holds more than the external LSDB limit non-default AS-external-LSAs in it database. The external LSDB limit MUST be set identically in all routers attached to the OSPF backbone and/or any regular OSPF area.

Syntax
external-lsdb-limit <-1-2147483647> **no external-lsdb-limit**

<-1-2147483647> - The range of external LSDB limit for OSPF is -1 to 2147483674.
<no> - This command configures the default external LSDB limit for OSPF.

Default Setting

The default value of external LSDB limit for OSPF is -1.

Command Mode

Router OSPF Config

6.3.2.26 **ip ospf areaid**

This command sets the OSPF area to which the specified router interface belongs. Assigning an area id, which does not exist on an interface, causes the area to be created with default values.

Syntax
ip ospf areaid <areaid>

< areaid > - It is an IP address, formatted as a 4-digit dotted-decimal number that uniquely identifies the area to which the interface connects.

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Default Setting

None

Command Mode

Interface Config

6.3.2.27 ip ospf authentication

This command sets the OSPF Authentication Type and Key for the specified interface. The value of <type> is either none, simple or encrypt. If the type is encrypt a <keyid> in the range of 0 and 255 must be specified.

Syntax
ip ospf authentication {none | {simple <key>} | {encrypt <key> <keyid>}}
no ip ospf authentication

< key > - It is composed of standard displayable, non-control keystrokes from a Standard 101/102-key keyboard. The authentication key must be 8 bytes or less if the authentication type is simple. If the type is encrypt, the key may be up to 256 bytes.
<keyid> - The range is 0 to 255.

Default Setting

The default authentication type is none. The default password key is not configured. Unauthenticated interfaces do not need an authentication. The default keyid is not configured.

Command Mode

Interface Config

6.3.2.28 ip ospf cost

This command configures the cost on an OSPF interface.

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Syntax
ip ospf cost <1-65535> **no ip ospf cost**

< 1-65535 > - The range of the cost is 1 to 65535.
<no> - This command configures the default cost on an OSPF interface.

Default Setting

The default cost value is 10.

Command Mode

Interface Config

6.3.2.29 ip ospf dead-interval

This command sets the OSPF dead interval for the specified interface.

Syntax
ip ospf dead-interval <1-2147483647> **no ip ospf dead-interval**

< 1-2147483647> - It is a valid positive integer, which represents the length of time in seconds that a router's Hello packets have not been seen before its neighbor routers declare that the router is down. The value for the length of time must be the same for all routers attached to a common network. This value should be some multiple of the Hello Interval (i.e. 4).
<no> - This command sets the default OSPF dead interval for the specified interface.

Default Setting

The default dead interval is 40 seconds.

Command Mode

Interface Config

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6.3.2.30 ip ospf hello -interval

This command sets the OSPF hello interval for the specified interface.

Syntax
ip ospf hello-interval <1-65535>
no ip ospf hello-interval

< 1-65535 > - Is a valid positive integer, which represents the length of time in seconds. The value for the length of time must be the same for all routers attached to a network.
<no> - This command sets the default OSPF hello interval for the specified interface.

Default Setting

The default hello interval is 10 seconds.

Command Mode

Interface Config

6.3.2.31 ip ospf priority

This command sets the OSPF priority for the specified router interface

Syntax
ip ospf priority <0-255>
no ip ospf priority

< 0-255 > - The range of the priority value is 0 to 255. A value of '0' indicates that the router is not eligible to become the designated router on this network.
<no> - This command sets the default OSPF priority for the specified interface.

Default Setting

The default priority value is 1. It is the highest router priority.

Command Mode

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Interface Config

6.3.2.32 **ip ospf retransmit-interval**

This command sets the OSPF retransmit Interval for the specified interface. The retransmit interval is specified in seconds.

Syntax
ip ospf retransmit-interval <0-3600>
no ip ospf retransmit-interval

< 0-3600 > - The value is the number of seconds between link-state advertisement retransmissions for adjacencies belonging to this router interface. This value is also used when retransmitting database and link-state request packets.
<no> - This command sets the default OSPF retransmit Interval for the specified interface.

Default Setting

The default retransmit interval is 5 seconds.

Command Mode

Interface Config

6.3.2.33 **ip ospf transmit-delay**

This command sets the OSPF Transmit Delay for the specified interface. The transmit delay is specified in seconds. In addition, it sets the estimated number of seconds it takes to transmit a link state update packet over this interface.

Syntax
ip ospf transmit-delay <1-3600>
no ip ospf transmit-delay

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< 1-3600 > - The range of transmit delay is 1 to 3600.

<no> - This command sets the default OSPF Transit Delay for the specified interface.

Default Setting

The default transmit delay is 1 second.

Command Mode

Interface Config

6.3.2.34 ip ospf mtu-ignore

This command disables OSPF maximum transmission unit (MTU) mismatch detection. OSPF
Database Description packets specify the size of the largest IP packet that can be sent without
fragmentation on the interface. When a router receives a Database Description packet, it examines the MTU advertised by the neighbor. By default, if the MTU is larger than the router can accept, the Database Description packet is rejected and the OSPF adjacency is not established.

Syntax
ip ospf mtu-ignore **no ip ospf mtu-ignore**

<no> - This command enables the OSPF MTU mismatch detection.

Default Setting

Enabled.

Command Mode

Interface Config

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6.3.2.35 **router-id**

This command sets a 4-digit dotted-decimal number uniquely identifying the router ospf id.

Syntax
router-id <ipaddress>

< ipaddress > - IP Address.

Default Setting

None.

Command Mode

Router OSPF Config

6.3.2.36 **redistribute**

This command configures OSPF protocol to redistribute routes from the specified source protocol/routers.

Syntax
redistribute {rip | static | connected} [metric <0-16777215>] [metric-type {1 | 2}] [tag <0-4294967295>] [subnets] **no redistribute {rip | static | connected} [metric] [metric-type] [tag] [subnets]**

<0-16777215> - The range of metric is 0 to 16777215.
<0-4294967295> - The range of tag is 0 to 4294967295.

Default Setting

The default value of metric is unspecified. The default value of metric type is 2. The default value of tag is 0.

Command Mode

Router OSPF Config

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6.3.2.37 **maximum-paths**

This command sets the number of paths that OSPF can report for a given destination where <maxpaths> is platform dependent.

Syntax
maximum-paths <1-1>
no maximum-paths

< 1-1 > - The maximum number of paths that OSPF can report for a given destination. The range of the value is 1 to 1.

Default Setting

The default value is 1.

Command Mode

Router OSPF Config.

6.4 Bootp/DHCP Relay Commands

6.4.1 *show bootpdhcprelay*

This command displays the BootP/DHCP Relay information.

Syntax
show bootpdhcprelay

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

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Maximum Hop Count: Is the maximum allowable relay agent hops.
Minimum Wait Time (Seconds) Is the minimum wait time.
Admin Mode Represents whether relaying of requests is enabled or disabled.
Server IP Address Is the IP Address for the BootP/DHCP Relay server.
Circuit Id Option Mode Is the DHCP circuit Id option which may be enabled or disabled.
Requests Received Is the number of requests received.
Requests Relayed Is the number of requests relayed.
Packets Discarded Is the number of packets discarded.

6.4.2 *bootpdhcprelay cidoptmode*

This command enables the circuit ID option mode for BootP/DHCP Relay on the system.

Syntax
bootpdhcprelay cidoptmode
no bootpdhcprelay cidoptmode

Default Setting

Disabled

Command Mode

Global Config

6.4.3 *bootpdhcprelay enable*

This command enables the forwarding of relay requests for BootP/DHCP Relay on the system.

Syntax
bootpdhcprelay enable
no bootpdhcprelay enable

no - Disable the forwarding of relay requests for BootP/DHCP Relay on the system.

Default Setting

Disabled

Command Mode

Global Config

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6.4.4 *bootpdhcprelay maxhopcount*

This command configures the maximum allowable relay agent hops for BootP/DHCP Relay on the system.

Syntax
bootpdhcprelay maxhopcount <1-16>
no bootpdhcprelay maxhopcount

<count> - The range of maximum hop count is 1 to 16.

no - Set the maximum hop count to 4.

Default Setting

The default value is 4.

Command Mode

Global Config

6.4.5 *bootpdhcprelay minwaittime*

This command configures the minimum wait time in seconds for BootP/DHCP Relay on the system. When the BOOTP relay agent receives a BOOTREQUEST message, it may use the seconds-since-client-began-booting field of the request as a factor in deciding whether to relay the request or not.

Syntax
bootpdhcprelay minwaittime <0-100>
no bootpdhcprelay minwaittime

<seconds> - The range of minimum wait time is 0 to 100.

no - Set the minimum wait time to 0 seconds.

Default Setting

The default value is 0.

Command Mode

Global Config

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6.4.6 *bootpdhcprelay serverip*

This command configures the server IP Address for BootP/DHCP Relay on the system.

Syntax
bootpdhcprelay serverip <ipaddr>
no bootpdhcprelay serverip

<ipaddr> - The IP address of the BootP/DHCP server.

no - Clear the IP address of the BootP/DHCP server.

Default Setting

None

Command Mode

Global Config

6.4.7 *ip dhcp restart*

Submit a BootP or DHCP client request.

Syntax
ip dhcp restart

Default Setting

None

Command Mode

Global Config

6.4.8 *ip dhcp client-identifier*

This commands specifies the DHCP client identifier for the switch.

Syntax
ip dhcp client-identifier {text <text> | hex <hex>}

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<text> - A text string which length is 1 to 15.

<hex> - A hex string which format is XX:XX:XX:XX:XX:XX (X is 0-9, A-F).

Default Setting

The default value for client-identifier is a text string "fortinet".

Command Mode

Global Config

6.5 Domain Name Server Relay Commands

6.5.1 *Show Commands*

6.5.1.1 show hosts

This command displays the static host name-to-address mapping table.

Syntax
show hosts

Default Setting

None

Command Mode

Privileged Exec

Display Message

Domain Name List: Domain Name.

IP Address: IP address of the Host.

6.5.1.2 show dns

This command displays the configuration of the DNS server.

Syntax

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show dns

Default Setting

None

Command Mode

Privileged Exec

Display Message

Domain Lookup Status: Enable or disable the IP Domain Naming System (DNS)-based host name-to-address translation function.

Default Domain Name: The default domain name that will be used for querying the IP address of a host.

Domain Name List: A list of domain names that will be used for querying the IP address of a host.

Name Server List: A list of domain name servers.

Request: Number of the DNS query packets been sent.

Response: Number of the DNS response packets been received.

6.5.1.3 **show dns cache**

This command displays all entries in the DNS cache table.

Syntax
show dns cache

Default Setting

None

Command Mode

Privileged Exec

Display Message

Domain Name List: Domain Name

IP Address: IP address of the corresponding domain name.

TTL: Time in seconds that this entry will remain in the DNS cache table

Flag: Indicates if this entry is reliable. A value of 8 is not as reliable as a value of 10.

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6.5.2 *Configuration Commands*

6.5.2.1 ip hosts

This command creates a static entry in the DNS table that maps a host name to an IP address.

Syntax
ip host <name> <ipaddr> **no ip host <name>**

<name> - Host name.

<ipaddr> - IP address of the host.

<no> - Remove the corresponding name to IP address mapping entry.

Default Setting

None

Command Mode

Privileged Exec

6.5.2.2 clear hosts

This command clears the entire static host name-to-address mapping table.

Syntax
clear hosts

Default Setting

None

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Command Mode

Privileged Exec

6.5.2.3 **ip domain-name**

This command defines the default domain name to be appended to incomplete host names (i.e., host names passed from a client are not formatted with dotted notation).

Syntax
ip domain-name <name> **no ip domain-name <name>**

<name> - Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. (Range: 1-64 characters)

Default Setting

None

Command Mode

Privileged Exec

6.5.2.4 **ip domain-list**

This command defines the domain name that can be appended to incomplete host names (i.e., host names passed from a client are not formatted with dotted notation). The domain name table can contain maximum 6 entries.

Syntax
ip domain-list <name> **no ip domain-list <name>**

<name> - Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. (Range: 1-64 characters)

Note - When an incomplete host name is received by the DNS server on this switch, it will work through the domain name list, append each domain name in the list to the host name, and check with the specified name servers for a match. If there is no domain name list, the domain name specified with the "*ip domain-name*" command is used. If there is a domain name list, the default domain name is not used.

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Default Setting

None

Command Mode

Privileged Exec

6.5.2.5 **ip name-server**

This command specifies the address of one or more domain name servers to use for name-to-address resolution. There are maximum 6 entries in the Domain Name Server Table.

Syntax
ip name-server <ipaddr> **no ip name-server <ipaddr>**

< ipaddr > - IP address of the Domain Name Servers.

<no> - Remove the corresponding Domain Name Server entry from the table.

Note - The listed name servers are queried in the specified sequence until a response is received, or the end of the list is reached with no response.

Default Setting

None

Command Mode

Privileged Exec

6.5.2.6 **ip domain-lookup**

This command enables the IP Domain Naming System (DNS)-based host name-to-address translation.

Syntax
ip domain-lookup **no ip domain-lookup**

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<no> - This command disables the IP Domain Naming System (DNS)-based host name-to-address translation.

Default Setting

None

Command Mode

Privileged Exec

6.5.2.7 **clear domain-list**

This command clears all entries in the domain name list table.

Syntax
clear domain-list

Default Setting

None

Command Mode

Privileged Exec

6.5.2.8 **clear dns**

This command sets the DNS configuration to default value.

Syntax
clear dns

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Default Setting

None

Command Mode

Privileged Exec

6.5.2.9 **clear dns cache**

This command clears all entries in the DNS cache table.

Syntax
clear dns cache

Default Setting

None

Command Mode

Privileged Exec

6.5.2.10 **clear dns counter**

This command clears the statistics of all entries in the DNS cache table.

Syntax
clear dns cache

Default Setting

None

Command Mode

Privileged Exec

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6.6 Routing Information Protocol (RIP) Commands

6.6.1 *Show Commands*

6.6.1.1 **show ip rip**

This command displays information relevant to the RIP router.

Syntax
show ip rip

Default Setting

None

Command Mode

Privileged Exec

Display Message

RIP Admin Mode: Select enable or disable from the pulldown menu. If you select enable RIP will be enabled for the switch. The default is disabled.
Split Horizon Mode: Select none, simple or poison reverse from the pulldown menu. Split horizon is a technique for avoiding problems caused by including routes in updates sent to the router from which the route was originally learned. The options are: None - no special processing for this case. Simple - a route will not be included in updates sent to the router from which it was learned. Poisoned reverse - a route will be included in updates sent to the router from which it was learned, but the metric will be set to infinity. The default is simple
Auto Summary Mode: Select enable or disable from the pulldown menu. If you select enable groups of adjacent routes will be summarized into single entries, in order to reduce the total number of entries. The default is enabled.
Host Routes Accept Mode: Select enable or disable from the pulldown menu. If you select enable the router will be accept host routes. The default is enabled.
Global Route Changes: The number of route changes made to the IP Route Database by RIP. This does not include the refresh of a route's age.
Global queries: The number of responses sent to RIP queries from other systems. Default Metric Sets a default for the metric of redistributed routes. This field displays the default metric if one has already been set or blank if not configured earlier. The valid values are (1 to 15).
Default Metric: Sets a default for the metric of redistributed routes. This field displays the default metric if one has already been set or blank if not configured earlier. The valid values are (1 to 15).
Default Route Advertise: The default route.

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6.6.1.2 **show ip rip interface**

This command displays information related to a particular RIP interface.

Syntax
show ip rip interface <slot/port>

< slot/port > - Interface number

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: Valid slot and port number separated by a forward slash. This is a configured value.
IP Address: The IP source address used by the specified RIP interface. This is a configured value.
Send version: The RIP version(s) used when sending updates on the specified interface. The types are none, RIP-1, RIP-1c, and RIP-2. This is a configured value.
Receive version: The RIP version(s) allowed when receiving updates from the specified interface. The types are none, RIP-1, RIP-2, Both. This is a configured value.
RIP Admin Mode: RIP administrative mode of router RIP operation; enable, disable it. This is a configured value.
Link State: Indicates whether the RIP interface is up or down. This is a configured value.
Authentication Type: The RIP Authentication Type for the specified interface. The types are none, simple, and encrypt. This is a configured value.
Authentication Key: 16 alpha-numeric characters for authentication key when uses simple or encrypt authentication.
Authentication Key ID: It is a Key ID when uses MD5 encryption for RIP authentication.
Default Metric: A number which represents the metric used for default routes in RIP updates originated on the specified interface. This is a configured value. The following information will be invalid if the link state is down.
Bad Packets Received: The number of RIP response packets received by the RIP process which were subsequently discarded for any reason.
Bad Routes Received: The number of routes contained in valid RIP packets that were ignored for any reason.
Updates Sent: The number of triggered RIP updates actually sent on this interface.

6.6.1.3 **show ip rip interface brief**

This command displays general information for each RIP interface. For this command to display successful results routing must be enabled per interface (i.e. ip rip).

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Syntax
show ip rip interface brief

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interfacet: Valid slot and port number separated by a forward slash.
IP Address: The IP source address used by the specified RIP interface.
Send Version: The RIP version(s) used when sending updates on the specified interface. The types are none, RIP-1, RIP-1c, RIP-2.
Receive Version: The RIP version(s) allowed when receiving updates from the specified interface. The types are none, RIP-1, RIP-2, Both
RIP Mode: RIP administrative mode of router RIP operation; enable, disable it.
Link State: The mode of the interface (up or down).

6.6.2 *Configuration Commands*

6.6.2.1 **enable rip**

This command resets the default administrative mode of RIP in the router (active).

Syntax
enable
no enable

no - This command sets the administrative mode of RIP in the router to inactive.

Default Setting

Enable

Command Mode

Router RIP Config

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6.6.2.2 **ip rip**

This command enables RIP on a router interface.

Syntax
Ip rip
no ip rip

no - This command disables RIP on a router interface.

Default Setting

Disabled

Command Mode

Interface Config

6.6.2.3 **auto-summary**

This command enables the RIP auto-summarization mode.

Syntax
auto-summary
no auto-summary

no - This command disables the RIP auto-summarization mode.

Default Setting

Disable

Command Mode

Router RIP Config

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6.6.2.4 **default-information originate**

This command is used to set the advertisement of default routes.

Syntax
default-information originate **no default-information originate**

no - This command is used to cancel the advertisement of default routes.

Default Setting

Not configured

Command Mode

Router RIP Config

6.6.2.5 **default-metric**

This command is used to set a default for the metric of distributed routes.

Syntax
default-metric <1-15> **no default-metric**

<1 - 15> - a value for default-metric.

no - This command is used to reset the default metric of distributed routes to its default value.

Default Setting

Not configured

Command Mode

Router RIP Config

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6.6.2.6 **distance rip**

This command sets the route preference value of RIP in the router. Lower route preference values are preferred when determining the best route.

Syntax
distance rip <1-255>
no distance rip

<1 - 255> - the value for distance.

no - This command sets the default route preference value of RIP in the router.

Default Setting

15

Command Mode

Router RIP Config

6.6.2.7 **hostrouteaccept**

This command enables the RIP hostroutesaccept mode.

Syntax
hostrouteaccept
no hostrouteaccept

no - This command disables the RIP hostroutesaccept mode.

Default Setting

Enable

Command Mode

Router RIP Config

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6.6.2.8 **split-horizon**

This command sets the RIP split horizon mode. **None mode** will not use RIP split horizon mode. **Simple mode** will be that a route is not advertised on the interface over which it is learned. **Poison mode** will be that routes learned over this interface should be re-advertised on the interface with a metric of infinity (16).

Syntax
split-horizon {none | simple | poison}
no split-horizon

none - This command sets without using RIP split horizon mode.

simple - This command sets to use simple split horizon mode.

poison - This command sets to use poison reverse mode.

no - This command cancel to set the RIP split horizon mode and sets none mode.

Default Setting

Simple

Command Mode

Router RIP Config

6.6.2.9 **distribute-list**

This command is used to specify the access list to filter routes received from the source protocol. Source protocols have OSPF, Static, and Connected.

Syntax
distribute-list <1-199> out {ospf | static | connected}
no distribute-list <1-199> out {ospf | static | connected}

<1 - 199> - Access List ID value. The Access List filters the routes to be redistributed by the source protocol.

no - This command is used to cancel the access list to filter routes received from the source protocol.

Default Setting

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0

Command Mode

Router RIP Config

6.6.2.10 **redistribute**

This command configures RIP protocol to redistribute routes from the specified source protocol/routers. There are five possible match options. When you submit the command redistribute ospf match <matchtype> the match-type or types specified are added to any match types presently being redistributed. Internal routes are redistributed by default. Source protocols have OSPF, Static, and Connetced. Match types will have internal, external 1, external 2, nssa-external 1, and nssa-external 2.

Syntax
Format for OSPF as source protocol:
redistribute ospf [metric <1-15>] [match [internal] [external 1] [external 2] [nssa-external 1] [nssa-external 2]]
Format for other source protocols:
redistribute {static | connected} [metric <1-15>]
no redistribute {ospf | static | connected} [metric] [match [internal] [external 1] [external 2] [nssa-external 1] [nssa-external 2]]

<1 - 15> - a value for metric.

no - This command de-configures RIP protocol to redistribute routes from the specified source protocol/routers.

Default Setting

Metric - not-configured
Match - internal

Command Mode

Router RIP Config

6.6.2.11 **ip rip authentication**

This command sets the RIP Version 2 Authentication Type and Key for the specified interface. The value of <type> is either **none**, **simple**, or **encrypt**.

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The value for authentication key [key] must be 16 bytes or less. The [key] is composed of standard displayable, non-control keystrokes from a Standard 101/102-key keyboard. If the value of <type> is encrypt, a keyid in the range of 0 and 255 must be specified.

Syntax

ip rip authentication {none | {simple <key>} | {encrypt <key> <keyid>}}

no ip rip authentication

none - This command uses no authentication.

simple - This command uses simple authentication for RIP authentication .

encrypt - This command uses MD5 encryption for RIP authentication.

<key> - 16 alpha-numeric characters to be used for authentication key.

<keyid> - a value in the range of 0 – 255 to be used for MD5 encryption.

no - This command sets the default RIP Version 2 Authentication Type.

Default Setting

None

Command Mode

Interface Config

6.6.2.12 **ip rip receive version**

This command configures the interface to allow RIP control packets of the specified version(s) to be received.

The value for <mode> is one of: **rip1** to receive only RIP version 1 formatted packets, **rip2** for RIP version 2, **both** to receive packets from either format, or **none** to not allow any RIP control packets to be received

Syntax

ip rip receive version {rip1 | rip2 | both | none}

no ip rip receive version

no - This command configures the interface to allow RIP control packets of the default version(s) to be received.

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Default Setting

Both

Command Mode

Interface Config

6.6.2.13 **ip rip send version**

This command configures the interface to allow RIP control packets of the specified version to be sent.

The value for <mode> is one of: **rip1** to broadcast RIP version 1 formatted packets, **rip1c** (RIP version 1 compatibility mode) which sends RIP version 2 formatted packets via broadcast, **rip2** for sending RIP version 2 using multicast, or **none** to not allow any RIP control packets to be sent.

Syntax
ip rip send version {rip1 | rip1c | rip2 | none} **no ip rip send version**

no - This command configures the interface to allow RIP control packets of the default version to be sent.

Default Setting

Rip2

Command Mode

Interface Config

6.7 Router Discovery Protocol Commands

6.7.1 ***show ip irdp***

This commands displays the router discovery information for all interfaces, or a specified interface.

Syntax

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show ip irdp {slot/port | all}

<slot/port> - Show router discovery information for the specified interface.

<all> - Show router discovery information for all interfaces.

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

Ad Mode Displays the advertise mode which indicates whether router discovery is enabled or disabled on this interface.
Advertise Address: Addresses to be used to advertise the router for the interface.
Max Int Displays the maximum advertise interval which is the maximum time allowed between sending router advertisements from the interface in seconds.
Min Int Displays the minimum advertise interval which is the minimum time allowed between sending router advertisements from the interface in seconds.
Hold Time Displays advertise holdtime which is the value of the holdtime field of the router advertisement sent from the interface in seconds.
Preferences Displays the preference of the address as a default router address, relative to other router addresses on the same subnet.

6.7.2 *ip irdp*

This command enables Router Discovery on an interface.

Syntax
ip irdp **no ip irdp**

<no> - Disable Router Discovery on an interface.

Default Setting

Disabled

Command Mode

Interface Config

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6.7.3 *ip irdp broadcast*

This command configures the address to be used to advertise the router for the interface.

Syntax
ip irdp broadcast
no ip irdp broadcast

broadcast - The address used is 255.255.255.255.

no - The address used is 224.0.0.1.

Default Setting

The default address is 224.0.0.1

Command Mode

Interface Config

6.7.4 *ip irdp holdtime*

This commands configures the value, in seconds, of the holdtime field of the router advertisement sent from this interface.

Syntax
ip irdp holdtime < maxadvertinterval-9000 >
no ip irdp holdtime

< maxadvertinterval-9000 > The range is the maxadvertinterval to 9000 seconds.

no - This command configures the default value, in seconds, of the holdtime field of the router advertisement sent from this interface.

Default Setting

The default value is 3* maxadvertinterval (600) =1800.

Command Mode

Global Config

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6.7.5 *ip irdp maxadvertinterval*

This commands configures the maximum time, in seconds, allowed between sending router advertisements from the interface.

Syntax
ip irdp maxadvertinterval < minadvertinterval-1800 >
no ip irdp maxadvertinterval

< minadvertinterval-1800 > - The range is 4 to 1800 seconds.

no - This command configures the default maximum time, in seconds.

Default Setting

The default value is 600.

Command Mode

Global Config

6.7.6 *ip irdp minadvertinterval*

This command configures the minimum time, in seconds, allowed between sending router advertisements from the interface.

Syntax
ip irdp minadvertinterval < 3-maxadvertinterval>
no ip irdp minadvertinterval

< 3-maxadvertinterval> - The range is 3 to maxadvertinterval seconds.

no - This command sets the minimum time to 450.

Default Setting

The default value is 450.

Command Mode

Global Config

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6.7.7 *ip irdp preference*

This command configures the preferability of the address as a default router address, relative to other router addresses on the same subnet.

Syntax
ip irdp preference < -2147483648-2147483647>
no ip irdp preference

< -2147483648-2147483647> - The range is -2147483648 to 2147483647.

no - This command sets the preference to 0.

Default Setting

The default value is 0.

Command Mode

Global Config

6.8 VLAN Routing Commands

6.8.1 *show ip vlan*

This command displays the VLAN routing information for all VLANs with routing enabled in the
system.

Syntax
show ip vlan

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

MAC Address used by Routing VLANs Is the MAC Address associated with the internal bridgerouter interface (IBRI). The same MAC Address is used by all VLAN routing interfaces. It will be displayed above the per-VLAN information.

VLAN ID Is the identifier of the VLAN.

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Logical Interface Indicates the logical slot/port associated with the VLAN routing interface.
IP Address Displays the IP Address associated with this VLAN.
Subnet Mask Indicates the subnet mask that is associated with this VLAN.
.

6.8.2 *vlan routing*

This command creates routing on a VLAN.

Syntax
vlan routing <vlanid>
no vlan routing <vlanid>

<vlanid> - The range is 1 to 3965.

no - Delete routing on a VLAN.

Default Setting

None

Command Mode

VLAN Database

6.9 Virtual Router Redundancy Protocol (VRRP) Commands

6.9.1 *Show Commands*

6.9.1.1 **show ip vrrp**

This command displays whether VRRP functionality is enabled or disabled. It also displays some global parameters which are required for monitoring.

Syntax
show ip vrrp

Default Setting

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None

Command Mode

Privileged Exec, User Exec

Display Message

Admin Mode Displays the administrative mode for VRRP functionality on the switch.
Router Checksum Errors Represents the total number of VRRP packets received with an invalid VRRP checksum value.
Router Version Errors Represents the total number of VRRP packets received with Unknown or unsupported version number.
Router VRID Errors Represents the total number of VRRP packets received with invalid VRID for this virtual router.

6.9.1.2 **show ip vrrp brief**

This command displays information about each virtual router configured on the switch.

Syntax
show ip vrrp brief

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

Interface Valid slot and port number separated by a forward slash.
VRID Represents the router ID of the virtual router.
IP Address Is the IP Address that was configured on the virtual router
Mode Represents whether the virtual router is enabled or disabled.
State Represents the state (Master/backup) of the virtual router.

6.9.1.3 **show ip vrrp interface**

This command displays all configuration information of a virtual router configured on a specific interface. Note that the information will be displayed only when the IP address of the specific interface is configured.

Syntax
show ip vrrp interface <slot/port> [<vrid>]

<slot/port> - Valid slot and port number separated by a forward slash.

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<vrid> - Virtual router ID.

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

VRID Represents the router ID of the virtual router.
Primary IP Address This field represents the configured IP Address for the Virtual router.
VMAC address Represents the VMAC address of the specified router.
Authentication type Represents the authentication type for the specific virtual router.
Priority Represents the priority value for the specific virtual router.
Advertisement interval Represents the advertisement interval for the specific virtual router.
Pre-Empt Mode Is the preemption mode configured on the specified virtual router.
Administrative Mode Represents the status (Enable or Disable) of the specific router.
State Represents the state (Master/backup) of the specific virtual router

6.9.1.4 **show ip vrrp interface stats**

This command displays the statistical information about each virtual router configured on the switch.

Syntax
show ip vrrp interface stats <slot/port> [<vrid>]

<slot/port> - Valid slot and port number separated by a forward slash.

<vrid> - Virtual router ID.

Default Setting

None

Command Mode

Privileged Exec, User Exec

Display Message

VRID Represents the router ID of the virtual router.
Uptime Is the time that the virtual router has been up, in days, hours, minutes and seconds.
Protocol Represents the protocol configured on the interface.
State Transitioned to Master Represents the total number of times virtual router state has changed to MASTER.
Advertisement Received Represents the total number of VRRP advertisements received by this virtual router.
Advertisement Interval Errors Represents the total number of VRRP advertisements received for which advertisement interval is different than the configured value for this virtual
router.

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Authentication Failure Represents the total number of VRRP packets received that don't pass the authentication check.
IP TTL errors Represents the total number of VRRP packets received by the virtual router with IP TTL (time to live) not equal to 255.
Zero Priority Packets Received Represents the total number of VRRP packets received by virtual router with a priority of '0'.
Zero Priority Packets Sent Represents the total number of VRRP packets sent by the virtual router with a priority of '0'
Invalid Type Packets Received Represents the total number of VRRP packets received by the virtual router with invalid 'type' field.
Address List Errors Represents the total number of VRRP packets received for which address list does not match the locally configured list for the virtual router.
Invalid Authentication Type Represents the total number of VRRP packets received with unknown authentication type.
Authentication Type Mismatch Represents the total number of VRRP advertisements received for which 'auth type' not equal to locally configured one for this virtual router.
Packet Length Errors Represents the total number of VRRP packets received with packet length less than length of VRRP header.

6.9.2 *Configuration Commands*

6.9.2.1 **ip vrrp**

This command enables the administrative mode of VRRP in the router.

Syntax
ip vrrp **no ip vrrp**

Default Setting

Disabled

Command Mode

Global Config

This command sets the virtual router ID on an interface for Virtual Router configuration in the router.

Syntax

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ip vrrp <1-255>

no ip vrrp <1-255>

<1-255> - The range of virtual router ID is 1 to 255.

<no> - This command removes all VRRP configuration details of the virtual router configured on a specific interface.

Default Setting

None

Command Mode

Interface Config

6.9.2.2 ip vrrp ip

This commands also designates the configured virtual router IP address as a secondary IP address on an interface.

Syntax

ip vrrp <1-255> ip <addr> [secondary]

no ip vrrp <1-255> ip <addr> [secondary]

<1-255> - The range of virtual router ID is 1 to 255.

<addr> - Secondary IP address of the router ID.

<no> - This command removes all VRRP configuration details of the virtual router configured on a specific interface.

Default Setting

None

Command Mode

Interface Config

6.9.2.3 ip vrrp mode

This command enables the virtual router configured on the specified interface. Enabling the status field starts a virtual router.

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Syntax

ip vrrp <1-255> mode

no ip vrrp <1-255> mode

<1-255> - The range of virtual router ID is 1 to 255.

<no> - Disable the virtual router configured on the specified interface. Disabling the status field stops a virtual router.

Default Setting

Disabled

Command Mode

Interface Config

6.9.2.4 **ip vrrp authentication**

This command sets the authorization details value for the virtual router configured on a specified interface.

Syntax

ip vrrp <1-255> authentication <key>

no ip vrrp <1-255> authentication

<1-255> - The range of virtual router ID is 1 to 255.

<key> - A text password used for authentication.

<no> - This command sets the default authorization details value for the virtual router configured on a specified interface.

Default Setting

no authentication

Command Mode

Interface Config

6.9.2.5 **ip vrrp preempt**

This command sets the preemption mode value for the virtual router configured on a specified interface.

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Syntax

ip vrrp <1-255> preempt

no ip vrrp <1-255> preempt

<1-255> - The range of virtual router ID is 1 to 255.

<no> - This command sets the default preemption mode value for the virtual router configured on a specified interface.

Default Setting

Enabled

Command Mode

Interface Config

6.9.2.6 **ip vrrp priority**

This command sets the priority value for the virtual router configured on a specified interface.

Syntax

ip vrrp <1-255> priority <1-255>

no ip vrrp <1-255> priority

<1-255> - The range of virtual router ID is 1 to 255.

<1-254> - The range of priority is 1 to 255.

<no> - This command sets the default priority value for the virtual router configured on a specified interface.

Default Setting

The default priority value is 100.

Command Mode

Interface Config

6.9.2.7 **ip vrrp timers advertise**

This command sets the advertisement value for a virtual router in seconds.

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Syntax

ip vrrp <1-255> timers advertise <1-255>

ip vrrp <1-255> timers advertise

<1-255> - The range of virtual router ID is 1 to 255.

< 1-255 > - The range of advertisement interval is 1 to 255.

<no> - This command sets the default advertisement value for a virtual router.

.

Default Setting

The default value of advertisement interval is 1.

Command Mode

Interface Config

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7 IP Multicast Commands

7.1 Distance Vector Multicast Routing Protocol (DVMRP) Commands

This section provides a detailed explanation of the DVMRP commands. The commands are divided into the following different groups:

Show commands are used to display device settings, statistics and other information. Configuration commands are used to configure features and options of the switch. For every configuration command there is a show command that will display the configuration setting.

7.1.1 *Show Commands*

7.1.1.1 **show ip dvmrp**

This command displays the system-wide information for DVMRP

Syntax
show ip dvmrp

Default Setting

None

Command Mode

Privileged Exec

User EXEC

Admin Mode This field indicates whether DVMRP is enabled or disabled. This is a configured value.

Display Message

Admin Mode Enable or disable DVMRP function.
Version This field indicates the version of DVMRP being used.
Total Number of Routes This field indicates the number of routes in the DVMRP routing table.
Reachable Routes This field indicates the number of entries in the routing table with non-infinitemetrics. The following fields are displayed for each interface**.**
Slot/Port Valid slot and port number separated by a forward slash.
Interface Mode This field indicates the mode of this interface. Possible values are Enabled and Disabled.
State This field indicates the current state of DVMRP on this interface. Possible values are Operational or Non-Operational.

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7.1.1.2 **show ip dvmrp interface**

This command displays the interface information for DVMRP on the specified interface.

Syntax
show ip dvmrp interface <slot/port>

<slot/port> - Valid slot and port number separated by a forward slash.

Default Setting

None

Command Mode

Privileged Exec
User EXEC

Display Message

Interface Mode This field indicates whether DVMRP is enabled or disabled on the specified interface. This is a configured value.
Interface Metric This field indicates the metric of this interface. This is a configured value.
Local Address This is the IP Address of the interface.
This Field is displayed only when DVMRP is operational on the interface.
Generation ID This is the Generation ID value for the interface. This is used by the neighboring routers to detect that the DVMRP table should be resent.
The following fields are displayed only if DVMRP is enabled on this interface.
Received Bad Packets This is the number of invalid packets received.
Received Bad Routes This is the number of invalid routes received.
Sent Routes This is the number of routes that have been sent on this interface.

7.1.1.3 **show ip dvmrp neighbor**

This command displays the neighbor information for DVMRP.

Syntax
show ip dvmrp neighbor

Default Setting

None

Command Mode

Privileged Exec
User EXEC

Display Message

IfIndex This field displays the value of the interface used to reach the neighbor.

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Nbr IP Addr This field indicates the IP Address of the DVMRP neighbor for which this entry contains information.
State This field displays the state of the neighboring router. The possible value for this field are ACTIVE or DOWN.
Up Time This field indicates the time since this neighboring router was learned.
Expiry Time This field indicates the time remaining for the neighbor to age out. This field is not applicable if the State is DOWN.
Generation ID This is the Generation ID value for the neighbor.
Major Version This shows the major version of DVMRP protocol of neighbor.
Minor Version This shows the minor version of DVMRP protocol of neighbor.
Capabilities This shows the capabilities of neighbor.
Received Routes This shows the number of routes received from the neighbor.
Rcvd Bad Pkts This field displays the number of invalid packets received from this neighbor.
Rcvd Bad Routes This field displays the number of correct packets received with invalid routes.

7.1.1.4 **show ip dvmrp nexthop**

This command displays the next hop information on outgoing interfaces for routing multicast datagrams.

Syntax
show ip dvmrp nexthop

Default Setting

None

Command Mode

Privileged Exec
User EXEC

Display Message

Source IP This field displays the sources for which this entry specifies a next hop on an outgoing interface.
Source Mask This field displays the IP Mask for the sources for which this entry specifies a next hop on an outgoing interface.
Next Hop Interface This field displays the interface in slot/port format for the outgoing interface for this next hop.
Type This field states whether the network is a LEAF or a BRANCH.

7.1.1.5 **show ip dvmrp prune**

This command displays the table listing the router's upstream prune information.

Syntax
show ip dvmrp prune

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Default Setting

None

Command Mode

Privileged Exec
User EXEC

Display Message

Group IP This field identifies the multicast Address that is pruned.
Source IP This field displays the IP Address of the source that has pruned.
Source Mask This field displays the network Mask for the prune source. It should be all 1s or both the prune source and prune mask must match.
Expiry Time (secs) This field indicates the expiry time in seconds. This is the time remaining for this prune to age out.

7.1.1.6 **show ip dvmrp route**

This command displays the multicast routing information for DVMRP.

Syntax
show ip dvmrp route

Default Setting

None

Command Mode

Privileged Exec
User EXEC

Display Message

Source Address This field displays the multicast address of the source group.
Source Mask This field displays the IP Mask for the source group.
Upstream Neighbor This field indicates the IP Address of the neighbor which is the source for the packets for a specified multicast address.
Interface This field displays the interface used to receive the packets sent by the sources.
Metric This field displays the distance in hops to the source subnet. This field has a different meaning than the Interface Metric field.
Expiry Time(secs) This field indicates the expiry time in seconds. This is the time remaining for this route to age out.
Up Time(secs) This field indicates the time when a specified route was learnt, in seconds.

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7.1.2 *Configuration Commands*

7.1.2.1 **ip dvmrp**

This command sets administrative mode of DVMRP in the router to active. IGMP must be enabled before DVMRP can be enabled.

Syntax
ip dvmrp
no ip dvmrp

no - This command sets administrative mode of DVMRP in the router to inactive. IGMP must be enabled before DVMRP can be enabled.

Default Setting

Disabled

Command Mode

Global Config

7.1.2.2 **ip dvmrp metric**

This command configures the metric for an interface. This value is used in the DVMRP messages as the cost to reach this network.

Syntax
ip dvmrp metric <value>
no ip dvmrp metric <value>

<value> - This field has a range of 1 to 63.

no - This command resets the metric for an interface to the default value. This value is used in the DVMRP messages as the cost to reach this network.

Default Setting

1

Command Mode

Interface Config

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7.2 Internet Group Management Protocol (IGMP) Commands

This section provides a detailed explanation of the IGMP commands. The commands are divided into the following different groups:

Show commands are used to display device settings, statistics and other information. Configuration commands are used to configure features and options of the switch. For every configuration command there is a show command that will display the configuration setting.

7.2.1 *Show Commands*

7.2.1.1 **show ip igmp**

This command displays the system-wide IGMP information.

Syntax
show ip igmp

Default Setting

None

Command Mode

Privileged Exec

User EXEC

Display Message

IGMP Admin Mode This field displays the administrative status of IGMP. This is a configured value.
Interface Valid slot and port number separated by a forward slash.
Interface Mode This field indicates whether IGMP is enabled or disabled on the interface. This is a configured value.
Protocol State This field indicates the current state of IGMP on this interface. Possible values are Operational or Non-Operational.

7.2.1.2 **show ip igmp groups**

This command displays the registered multicast groups on the interface. If “detail” is specified this command displays the registered multicast groups on the interface in detail.

Syntax

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show ip igmp groups <slot/ports> [detail]

<slot/port> - Valid slot and port number separated by a forward slash.

[detail] - Display details of subscribed multicast groups.

Default Setting

None

Command Mode

Privileged Exec

Display Message

IP Address This displays the IP address of the interface participating in the multicast group.
Subnet Mask This displays the subnet mask of the interface participating in the multicast group.
Interface Mode This displays whether IGMP is enabled or disabled on this interface.
The following fields are not displayed if the interface is not enabled:
Querier Status This displays whether the interface has IGMP in Querier mode or Non-Querier mode.
Groups This displays the list of multicast groups that are registered on this interface.

If detail is specified, the following fields are displayed:
Multicast IP Address This displays the IP Address of the registered multicast group on this interface.
Last Reporter This displays the IP Address of the source of the last membership report received for the specified multicast group address on this interface.
Up Time This displays the time elapsed since the entry was created for the specified multicast group address on this interface.
Expiry Time This displays the amount of time remaining to remove this entry before it is aged out.
Version1 Host Timer This displays the time remaining until the local router will assume that there are no longer any IGMP version 1 multicast members on the IP subnet attached to this interface. This could be an integer value or "-----" if there is no Version 1 host present.
Version2 Host Timer TThis displays the time remaining until the local router will assume that there are no longer any IGMP version 2 multicast members on the IP subnet attached to this interface.This could be an integer value or "-----" if there is no Version 2 host present.
Group Compatibilty Mode The group compatibility mode (v1, v2 or v3) for this group on the specified interface.

7.2.1.3 **show ip igmp interface**

This command displays the IGMP information for the interface.

Syntax

show ip igmp interface <slot/port>

<slot/port> - Valid slot and port number separated by a forward slash.

Default Setting

None

Command Mode

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Privileged Exec
User EXEC

Display Message

Slot/Port Valid slot and port number separated by a forward slash.
IGMP Admin Mode This field displays the administrative status of IGMP. This is a configured value.

Interface Mode This field indicates whether IGMP is enabled or disabled on the interface. This is a configured value.
IGMP Version This field indicates the version of IGMP running on the interface. This value can be configured to create a router capable of running either IGMP version 1 or 2.
Query Interval (secs) This field indicates the frequency at which IGMP Host-Query packets are transmitted on this interface. This is a configured value.
Query Max Response Time (1/10 of a second) This field indicates the maximum query response time advertised in IGMPv2 queries on this interface. This is a configured value.
Robustness This field displays the tuning for the expected packet loss on a subnet. If a subnet is expected to be have a lot of loss, the Robustness variable may be increased for that interface. This is a configured value.
Startup Query Interval (secs) This value indicates the interval between General Queries sent by a Querier on startup. This is a configured value.
Startup Query Count This value is the number of Queries sent out on startup, separated by the Startup Query Interval. This is a configured value.
Last Member Query Interval (1/10 of a second) This value indicates the Maximum Response Time inserted into Group-Specific Queries sent in response to Leave Group messages. This is a configured value.
Last Member Query Count This value is the number of Group-Specific Queries sent before the router assumes that there are no local members. This is a configured value.

7.2.1.4 **show ip igmp interface membership**

This command displays the list of interfaces that have registered in the multicast group.

Syntax
show ip igmp interface membership <multiipaddr> [detail]

< multiipaddr > - A multicast IP address..

[detail] - Display details of subscribed multicast groups.

Default Setting

None

Command Mode

Privileged Exec
User EXEC

Display Message

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IInterface Valid slot and port number separated by a forward slash.
Interface IP This displays the IP address of the interface participating in the multicast group.
State This displays whether the interface has IGMP in Querier mode or Non-Querier mode.
Group Compatibility Mode The group compatibility mode (v1, v2 or v3) for the specified group on this interface.
Source Filter Mode The source filter mode (Include/Exclude) for the specified group on this interface. This is "-----" for IGMPv1 and IGMPv2 Membership Reports.

If detail is specified, the following fields are displayed:
Interface Valid slot and port number separated by a forward slash.
Group Compatibility Mode The group compatibility mode (v1, v2 or v3) for the specified group on this interface.
Source Filter Mode The source filter mode (Include/Exclude) for the specified group on this interface. This is "-----" for IGMPv1 and IGMPv2 Membership Reports.
Source Hosts This displays the list of unicast source IP Addresses in the group record of the IGMPv3 Membership Report with the specified multicast group IP Address. This is "-----" for IGMPv1 and IGMPv2 Membership Reports.
Expiry Time This displays the amount of time remaining to remove this entry before it is aged out. This is "-----" for IGMPv1 and IGMPv2 Membership Reports.

7.2.1.5 **show ip igmp interface stats**

This command displays the IGMP statistical information for the given interface. The statistics are only displayed when the interface is enabled for IGMP.

Syntax
show ip igmp interface stats <slot/port>

<slot/port> - Valid slot and port number separated by a forward slash.

Default Setting

None

Command Mode

Privileged Exec
User EXEC

Display Message

Querier Status This field indicates the status of the IGMP router, whether it is running in Querier mode or Non-Querier mode.
Querier IP Address This field displays the IP Address of the IGMP Querier on the IP subnet to which this interface is attached.
Querier Up Time This field indicates the time since the interface Querier was last changed.
Querier Expiry Time This field displays the amount of time remaining before the Other Querier Present Timer expires. If the local system is the querier, the value of this object is zero.

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Wrong Version Queries This field indicates the number of queries received whose IGMP version does not match the IGMP version of the interface.
Number of Joins This field displays the number of times a group membership has been added on this interface.
Number of Groups This field indicates the current number of membership entries for this interface.

7.2.2 *Configuration Commands*

7.2.2.1 ip igmp

This command sets the administrative mode of IGMP in the router to active.

Syntax
ip igmp
no ip igmp

no - This command sets the administrative mode of IGMP in the router to inactive.

Default Setting

Disabled

Command Mode

Global Config

7.2.2.2 ip igmp version

This command configures the version of IGMP for an interface.

Syntax
ip igmp version {1 | 2 | 3}
no ip igmp version

<1- 3> - The igmp version number.

no - This command resets the version of IGMP for this interface. The version is reset to the default value.

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Default Setting

3

Command Mode

Interface Config

7.2.2.3 ip igmp last-member-query-count

This command sets the number of Group-Specific Queries sent before the router assumes that there are no local members on the interface.

Syntax
ip igmp last-member-query-count <1-20>
no ip igmp last-member-query-count

<1-20> - The range for <1-20> is 1 to 20.

no - This command resets the number of Group-Specific Queries to the default value.

Default Setting

Disabled

Command Mode

Interface Config

7.2.2.4 ip igmp last-member-query-interval

This command configures the Maximum Response Time being inserted into Group-Specific Queries sent in response to Leave Group messages on the interface.

Syntax
ip igmp last-member-query-interval <0-255>
no ip igmp last-member-query-interval

<0-255> - The range for <0-255> is 0 to 255 tenths of a second.

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no - This command resets the Maximum Response Time being inserted into Group-Specific Queries sent in response to Leave Group messages on the interface to the default value.

Default Setting

1 second

Command Mode

Interface Config

7.2.2.5 ip igmp query-interval

This command configures the query interval for the specified interface. This is the frequency at which IGMP Host-Query packets are transmitted on this interface.

Syntax
ip igmp query-interval <1-3600>
no ip igmp query-interval

<1-3600> - The range for <1-3600> is 1 to 3600 seconds.
no - This command resets the query interval for the specified interface to the default value. This is the frequency at which IGMP Host-Query packets are transmitted on this interface.
.

Default Setting

125 seconds

Command Mode

Interface Config

7.2.2.6 ip igmp query-max-response-time

This command configures the maximum response time interval for the specified interface, which is the maximum query response time advertised in IGMPv2 queries on this interface.The time interval is specified in tenths of a second.

Syntax
ip igmp query-max-response-time <0-255>
no ip igmp query-max-response-time

<0-255> - The range for <0-255> is 0 to 255 tenths of a second.

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no - This command resets the maximum response time interval for the specified interface, which is the maximum query response time advertised in IGMPv2 queries on this interface to the default value. The maximum response time interval is reset to the default time.

Default Setting

100

Command Mode

Interface Config

7.2.2.7 ip igmp robustness

This command configures the robustness that allows tuning of the interface. The robustness is the tuning for the expected packet loss on a subnet. If a subnet is expected to have a lot of loss, the Robustness variable may be increased for the interface.

Syntax
ip igmp robustness <1-255>
no ip igmp robustness

<1-255> - The range for <1-255> is 1 to 255.

no - This command sets the robustness value to default.

Default Setting

2

Command Mode

Interface Config

7.2.2.8 ip igmp startup-query-count

This command sets the number of Queries sent out on startup, separated by the Startup Query Interval on the interface.

Syntax
ip igmp startup-query-count <1-20>
no ip igmp startup-query-count

<1-20> - The range for <1-20> is 1 to 20.

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no - This command resets the number of Queries sent out on startup, separated by the Startup Query Interval on the interface to the default value.

Default Setting

2

Command Mode

Interface Config

7.2.2.9 ip igmp startup-query-interval

This command sets the interval between General Queries sent by a Querier on startup on the interface. The time interval value is in seconds.

Syntax
ip igmp startup-query-interval <1-300> **no ip igmp startup-query-interval**

<1-300> - The range for <1-300> is 1 to 300 seconds.

no - This command resets the interval between General Queries sent by a Querier on startup on the interface to the default value.

Default Setting

31

Command Mode

Interface Config

7.3 Multicast Commands

7.3.1 *Show Commands*

7.3.1.1 show ip mcast

This command displays the system-wide multicast information

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Syntax
show ip mcast

Default Setting

None

Command Mode

Privileged Exec

Display Message

Admin Mode: This field displays the administrative status of multicast. This is a configured value.
Protocol State: This field indicates the current state of the multicast protocol. Possible values are Operational or Non-Operational.
Table Max Size: This field displays the maximum number of entries allowed in the multicast table.
Number Of Packets For Which Source Not Found: This displays the number of packets for which the source is not found.
Number Of Packets For Which Group Not Found: This displays the number of packets for which the group is not found.
Protocol: This field displays the multicast protocol running on the router. Possible values are PIMDM, PIMSM, or DVMRP.
Forwarding Multicast Stream Entry Count: This field displays the number of entries in the multicast table.
Highest Entry Count: This field displays the highest entry count in the multicast table.

7.3.1.2 **show ip mcast boundary**

This command displays all the configured administrative scoped multicast boundaries.

Syntax
show ip mcast boundary {<slot/port> | all}

< slot/port > - Interface number.

all - This command represents all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

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Interface: Valid slot and port number separated by a forward slash.
Group IP: The group IP address.
Mask: The group IP mask.

7.3.1.3 **show ip mcast interface**

This command displays the multicast information for the specified interface.

Syntax
show ip mcast interface <slot/port>

< slot/port > - Interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: Valid slot and port number separated by a forward slash.
TTL: This field displays the time-to-live value for this interface.

7.3.1.4 **show ip mcast mroute**

This command displays a summary or all the details of the multicast table.

Syntax
show ip mcast mroute {detail | summary}

detail - displays the multicast routing table details.

summary - displays the multicast routing table summary.

Default Setting

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None

Command Mode

Privileged Exec

Display Message

If the "**detail**" parameter is specified, the following fields are displayed:
Source IP: This field displays the IP address of the multicast data source.
Group IP: This field displays the IP address of the destination of the multicast packet.
Expiry Time (secs): This field displays the time of expiry of this entry in seconds.
Up Time (secs): This field displays the time elapsed since the entry was created in seconds.
RPF Neighbor: This field displays the IP address of the RPF neighbor.
Flags: This field displays the flags associated with this entry.

If the "**summary**" parameter is specified, the following fields are displayed:
Source IP: This field displays the IP address of the multicast data source.
Group IP: This field displays the IP address of the destination of the multicast packet.
Protocol: This field displays the multicast routing protocol by which this entry was created.
Incoming Interface: This field displays the interface on which the packet for this source/group arrives.
Outgoing Interface List: This field displays the list of outgoing interfaces on which this packet is forwarded.

This command displays the multicast configuration settings such as flags, timer settings, incoming and outgoing interfaces, RPF neighboring routers, and expiration times of all the entries in the multicast mroute table containing the given <groupipaddr>.

Syntax
show ip mcast mroute group <groupipaddr> {detail |summary}

< groupipaddr > - the IP Address of the destination of the multicast packet.

detail - Display the multicast routing table details.

summary - Display the multicast routing table summary.

Default Setting

None

Command Mode

Privileged Exec

Display Message

If the **detail** parameter is specified the follow fields are displayed:
Source IP: This field displays the IP address of the multicast data source.
Group IP: This field displays the IP address of the destination of the multicast packet.
Expiry Time (secs): This field displays the time of expiry of this entry in seconds.
Up Time (secs): This field displays the time elapsed since the entry was created in seconds.

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RPF Neighbor: This field displays the IP address of the RPF neighbor.
Flags: This field displays the flags associated with this entry.

If the **summary** parameter is specified the follow fields are displayed:
Source IP: This field displays the IP address of the multicast data source.
Group IP: This field displays the IP address of the destination of the multicast packet.
Protocol This field displays the multicast routing protocol by which this entry was created.
Incoming Interface: This field displays the interface on which the packet for this group arrives.
Outgoing Interface List: This field displays the list of outgoing interfaces on which this packet is forwarded.

This command displays the multicast configuration settings such as flags, timer settings, incoming and outgoing interfaces, RPF neighboring routers, and expiration times of all the entries in the multicast mroute table containing the given <sourceipaddr> or <sourceipaddr> [<groupipaddr>] pair.

Syntax

show ip mcast mroute source <sourceipaddr> {summary | <groupipaddr>}

< sourceipaddr > - the IP Address of the multicast data source.

summary - display the multicast routing table summary

< groupipaddr > - the IP Address of the destination of the multicast packet.

Default Setting

None

Command Mode

Privileged Exec

Display Message

If the **< groupipaddr >** parameter is specified the follow fields are displayed:
Source IP: This field displays the IP address of the multicast data source.
Group IP: This field displays the IP address of the destination of the multicast packet.
Expiry Time (secs): This field displays the time of expiry of this entry in seconds.
Up Time (secs): This field displays the time elapsed since the entry was created in seconds.
RPF Neighbor: This field displays the IP address of the RPF neighbor.
Flags: This field displays the flags associated with this entry.

If the **summary** parameter is specified the follow fields are displayed:
Source IP: This field displays the IP address of the multicast data source.
Group IP: This field displays the IP address of the destination of the multicast packet.
Protocol: This field displays the multicast routing protocol by which this entry was created.
Incoming Interface: This field displays the interface on which the packet for this source arrives.
Outgoing Interface List: This field displays the list of outgoing interfaces on which this packet is forwarded.

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This command displays all the static routes configured in the static mcast table if is specified or displays the static route associated with the particular <sourceipaddr>.

Syntax
show ip mcast mroute static [<sourceipaddr>]

< sourceipaddr > - the IP Address of the multicast data source.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Source IP: This field displays the IP address of the multicast packet source.
Source Mask: This field displays the mask applied to the IP address of the multicast packet source.
RPF Address: This field displays the IP address to be used as RPF for the given source and mask.
Metric: This field displays the metric value corresponding to the source address.
Interface: Valid slot and port number separated by a forward slash.

7.3.1.5 **show mrinfo**

This command is used to display the neighbor information of a multicast-capable router from the results buffer pool of the router subsequent to the execution/completion of a "mrinfo [ipaddr]" command. The results subsequent to the completion of the latest "mrinfo" will be available in the buffer pool after a maximum duration of two minutes after the completion of the ‘show mrinfo’ command. A subsequent issue ‘mrinfo’ will overwrite the contents of the buffer pool with fresh results.

Syntax
show mrinfo

Default Setting

None

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Command Mode

Privileged Exec

Display Message

Router Interface: The IP address of this neighbor.
Neighbor: The neighbor associated with the router interface.
Metric: The metric value associated with this neighbor.
TTL: The TTL threshold associated with this neighbor.
Flags: Status of the neighbor.

7.3.1.6 **show mstat**

This command is used to display the results of packet rate and loss information from the results buffer pool of the router, subsequent to the execution/completion of a ‘mstat <source> [group] [receiver]’ command. Within two minutes of the completion of the ‘mstat’ command, the results will be available in the buffer pool. The next issuing of "mstat" would overwrite the buffer pool with fresh results.

Syntax
show mstat

Default Setting

None

Command Mode

Privileged Exec

Display Message

7.3.1.7 **show mtrace**

This command is used to display results of multicast trace path from the results buffer pool of the router, subsequent to the execution/completion of a "mtrace <source> [group] [receiver]" command. The results subsequent to the completion of the "mtrace" will be available in the buffer pool within 2 minutes and thereafter. A subsequent "mtrace" command would overwrite the results in the buffer pool.

Syntax

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show mtrace

Default Setting

None

Command Mode

Privileged Exec

Display Message

Hops Away From Destination: The ordering of intermediate routers between the source and the destination.
Intermediate Router Address: The address of the intermediate router at the specified hop distance.
Mcast Protocol In Use: The multicast routing protocol used for the out interface of the specified intermediate router.
TTL Threshold: The Time-To-Live threshold of the out interface on the specified intermediate router.
Time Elapsed Between Hops (msecs): The time between arrival at one intermediate router to the arrival at the next.

7.3.2 *Configuration Commands*

7.3.2.1 ip multicast

This command sets the administrative mode of the IP multicast forwarder in the router to active. For multicast routing to become operational, IGMP must be currently enabled. An error message will be displayed on the CLI if multicast routing is enabled while IGMP is disabled. However, the IP multicast mode configuration is stored in the multicast configuration file and is automatically enabled once IGMP is enabled.

Syntax
ip multicast **no ip multicast**

no - This command sets the administrative mode of the IP multicast forwarder in the router to inactive . For multicast routing to become operational, IGMP must be currently enabled. An error message will be displayed on the CLI if multicast routing is enabled while IGMP is disabled. However, the IP multicast mode configuration is stored in the multicast configuration file and is automatically enabled once IGMP is enabled.

Default Setting

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Disbale

Command Mode

Global Config

7.3.2.2 **ip multicast staticroute**

This command creates a static route which is used to perform RPF checking in multicast packet forwarding. The combination of the <sourceipaddr> and the <mask> fields specify the network IP address of the multicast packet source. The <groupipaddr> is the IP address of the next hop toward the source. The <metric> is the cost of the route entry for comparison with other routes to the source network and is a value in the range of 0 and 255. The *current* incoming interface is used for RPF checking for multicast packets matching this multicast static route entry.

Syntax
ip multicast staticroute <sourceipaddr> <mask> <rpfipaddr> <0-255> <slot/port> **no ip multicast staticroute <sourceipaddr>**

< sourceipaddr > - the IP Address that identifies the multicast packet source for the entry you are creating.

< mask > - the subnet mask to be applied to the Source IP address.

< rpfipaddr > - the IP address of the neighbor router on the path to the source.

< 0-255 > - the link state cost of the path to the multicast source. The range is 0 – 255.

< slot/port > - the interface number.

no - This command deletes a static route in the static mcast table. The <sourceipaddr> is the IP address of the multicast packet source.

Default Setting

None

Command Mode

Global Config

7.3.2.3 **no ip mcast mroute**

This command is used to clear entries in the mroute table. The all parameters is used to clear all entries.

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The source parameter is used to clear the routes in the mroute table entries containing the specified <sourceipaddr> or <sourceipaddr> [groupipaddr] pair. The source address is the source IP address of the multicast packet. The group address is the Group Destination IP address of the multicast packet.

The group parameter is used to clear the routes in the mroute table entries containing the specified <groupipaddr>. The group address is the Group Destination IP address of the multicast packet.

Syntax
no ip mcast mroute {group <groupipaddr> | source <sourceipaddr> [<groupipaddr>] | all}

< groupipaddr > - the IP address of the destination of the multicast packet.

< sourceipaddr > - the IP address of the multicast packet source.

all - This command is used to clear all entries.

Default Setting

None

Command Mode

Global Config

7.3.2.4 ip mcast boundary

This command adds an administrative scope multicast boundary specified by <groupipaddr> and <mask> for which this multicast administrative boundary is applicable. <groupipaddr> is a group IP address and <mask> is a group IP mask.

Syntax
ip mcast boundary <groupipaddr> <mask>
no ip mcast boundary <groupipaddr> <mask>

< groupipaddr > - the multicast group address for the start of the range of addresses to be excluded. The address must be in the range of 239.0.0.0 through 239.255.255.255.

< mask > - mask to be applied to the multicast group address.

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no - This command deletes an administrative scope multicast boundary specified by <groupipaddr> and <mask> for which this multicast administrative boundary is applicable. <groupipaddr> is a group IP address and <mask> is a group IP mask.

Default Setting

None

Command Mode

Interface Config

7.3.2.5 ip multicast ttl-threshold

This command applies the given <ttlthreshold> to a routing interface. The <ttlthreshold> is the
TTL threshold which is to be applied to the multicast Data packets which are to be forwarded from the interface. The value for <ttlthreshold> has range from 0 to 255.

Syntax
ip multicast ttl-threshold <0 - 255> **no ip multicast ttl-threshold**

< 0 - 255 > - the TTL threshold.

no - This command applies the default <ttlthreshold> to a routing interface. The <ttlthreshold> is the TTL threshold which is to be applied to the multicast Data packets which are to be forwarded from the interface.

Default Setting

1

Command Mode

Interface Config

7.3.2.6 mrinfo

This command is used to query the neighbor information of a multicast-capable router specified by [<ipaddr>]. The default value is the IP address of the system at which the command is issued. The mrinfo command can take up to 2 minutes to complete. Only one mrinfo command may be in process at a time. The results of this command will be available in the results bufferpool which can be displayed by using "show mrinfo".

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Syntax
mrinfo [<ipaddr>]

<ipaddr> - the IP address of the multicast capable router.

Default Setting

None

Command Mode

Privileged Exec

7.3.2.7 **mstat**

This command is used to find the packet rate and loss information path from a source to a receiver (unicast router id of the host running mstat). The results of this command will be available in the results bufferpool which can be displayed by using "show mstat". If a debug command is already in progress, a message is displayed and the new request fails.

The <source> is the IP Address of the remote multicast-capable source. The [<receiver>] is the IP address of the receiver. The default value is the IP address of system at which the command is issued. The [<group>] is a multicast address of the group to be displayed. Default value is 224.2.0.1

Syntax
mstat <source> [<group>] [<receiver>]

< source > - the IP address of the multicast data source.
<group> - the multicast address of the group to be traced. If you leave this field blank, the multicast address 224.2.0.1 will be used. Valid addresses are 224.0.0.0 through 239.255.255.255.
< receiver > - the IP address of the host to which the *mstat* response will be sent by the last hop router.

Default Setting

None

Command Mode

Privileged Exec

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7.3.2.8 **mtrace**

This command is used to find the multicast path from a source to a receiver (unicast router ID of the host running mtrace). A trace query is passed hop-by-hop along the reverse path from the receiver to the source, collecting hop addresses, packet counts, and routing error conditions along the path, and then the response is returned to the requestor. The results of this command will be available in the results buffer pool which can be displayed by using "show mtrace".

The <source> is the IP Address of the remote multicast-capable source. The [<destination>] is the IP address of the receiver. The default value is the IP address of system at which the command is issued. The [<group>] is the multicast address of the group to be displayed. The default value is 224.2.0.1

If a debug command is already in execution, a message is displayed and the new request fails.

Syntax
mtrace <source> [<group>] [<destination>]

< source > - the IP address of the multicast data source.
< group > - the Multicast address of the group to be traced. If you do not enter a valid address, multicast address 224.2.0.1 will be used. Valid addresses are 224.0.0.0 through 239.255.255.255.
< destination > - the IP address of the host to which the *mtrace* response will be sent by the last hop router.

Default Setting

None

Command Mode

Privileged Exec

7.3.2.9 **disable ip multicast mdebug mtrace**

This command is used to disable the processing capability of mtrace query on this router. If the mode is enabled, the mtrace queries received by the router are processed and forwarded appropriately by the router. If the mode is disabled, this router does not respond to the mtrace queries it receives from other router devices.

Syntax
disable ip multicast mdebug mtrace

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no disable ip multicast mdebug mtrace

no - This command is used to enable the processing capability of mtrace query on this router. If the mode is enabled, the mtrace queries received by the router are processed and forwarded appropriately by the router. If the mode is disabled, this router does not respond to the mtrace queries it receives from other router devices.

Default Setting

None

Command Mode

Global Config

7.4 Protocol Independent Multicast – Dense Mode (PIM-DM) Commands

7.4.1 *Show Commands*

7.4.1.1 show ip pimdm

This command displays the system-wide information for PIM-DM.

Syntax
show ip pimdm

Default Setting

None

Command Mode

Privileged Exec

Display Message

Admin Mode: This field indicates whether PIM-DM is enabled or disabled. This is a configured value.
Interface: Valid slot and port number separated by a forward slash.
Interface Mode: This field indicates whether PIM-DM is enabled or disabled on this interface. This is a configured value.
Protocol State: This field indicates the current state of PIM-DM on this interface. Possible values are Operational or Non-Operational.

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7.4.1.2 **show ip pimdm interface**

This command displays the interface information for PIM-DM on the specified interface.

Syntax
show ip pimdm interface <slot/port>

< slot/port > - Interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface Mode: This field indicates whether PIM-DM is enabled or disabled on the specified interface. This is a configured value.
Hello Interval (secs): This field indicates the frequency at which PIM hello messages are transmitted on this interface. By default, the value is 30 seconds.

7.4.1.3 **show ip pimdm interface stats**

This command displays the statistical information for PIM-DM on the specified interface.

Syntax
show ip pimdm interface stats {<slot/port> | all}

< slot/port > - Interface number.

all - this command represents all interfaces.

Default Setting

None

Command Mode

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Privileged Exec

Display Message

Interface: Valid slot and port number separated by a forward slash.
IP Address: This field indicates the IP Address that represents the PIM-DM interface.
Nbr Count: This field displays the neighbor count for the PIM-DM interface.
Hello Interval: This field indicates the time interval between two hello messages sent from the router on the given interface.
Designated Router: This indicates the IP Address of the Designated Router for this interface.

7.4.1.4 **show ip pimdm neighbor**

This command displays the neighbor information for PIM-DM on the specified interface.

Syntax
show ip pimdm neighbor [<slot/port> | all]

< slot/port > - Interface number.

all - this command represents all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Neighbor Addr: This field displays the IP Address of the neighbor on an interface.
Interface: Valid slot and port number separated by a forward slash.
Up Time: This field indicates the time since this neighbor has become active on this interface.
Expiry Time: This field indicates the expiry time of the neighbor on this interface.

7.4.2 *Configuration Commands*

7.4.2.1 **ip pimdm**

This command enables the administrative mode of PIM-DM in the router.

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Syntax
ip pimdm **no ip pimdm**

no - This command disables the administrative mode of PIM-DM in the router. IGMP must be enabled before PIM-DM can be enabled.

Default Setting

Disabled

Command Mode

Global Config

7.4.2.2 ip pimdm mode

This command sets administrative mode of PIM-DM on an interface to enabled.

Syntax
ip pimdm mode **no ip pimdm mode**

no - This command sets administrative mode of PIM-DM on an interface to disabled.

Default Setting

Disabled

Command Mode

Interface Config

7.4.2.3 ip pimdm query-interval

This command configures the transmission frequency of hello messages between PIM enabled neighbors. This field has a range of 10 to 3600 seconds.

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Syntax
ip pimdm query-interval <10 - 3600> **no ip pimdm query-interval**

<10 - 3600> - This is time interval in seconds.
no - This command resets the transmission frequency of hello messages between PIM enabled neighbors to the default value.

Default Setting

30

Command Mode

Interface Config

7.5 Protocol Independent Multicast – Sparse Mode (PIM-SM) Commands

7.5.1 *Show Commands*

7.5.1.1 **show ip pimsm**

This command displays the system-wide information for PIM-SM.

Syntax
show ip pimsm

Default Setting

None

Command Mode

Privileged Exec

Display Message

Admin Mode: This field indicates whether PIM-SM is enabled or disabled. This is a configured value.
Join/Prune Interval (secs): This field shows the interval at which periodic PIM-SM Join/Prune messages are to be sent. This is a configured value.

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Data Threshold Rate (Kbps): This field shows the data threshold rate for the PIM-SM router. This is a configured value.
Register Threshold Rate (Kbps): This field indicates the threshold rate for the RP router to switch to the shortest path. This is a configured value.
Interface: Valid slot and port number separated by a forward slash.
Interface Mode: This field indicates whether PIM-SM is enabled or disabled on the interface. This is a configured value.
Protocol State: This field indicates the current state of the PIM-SM protocol on the interface. Possible values are Operational or Non-Operational.

7.5.1.2 **show ip pimsm componenttable**

This command displays the table containing objects specific to a PIM domain. One row exists for each domain to which the router is connected.

Syntax
show ip pimsm componenttable

Default Setting

None

Command Mode

Privileged Exec

Display Message

Component Index: This field displays a number which uniquely identifies the component.
Component BSR Address: This field displays the IP address of the bootstrap router (BSR) for the local PIM region.
Component BSR Expiry Time: This field displays the minimum time remaining before the BSR in the local domain will be declared down.
Component CRP Hold Time: This field displays the hold time of the component when it is a candidate.

7.5.1.3 **show ip pimsm interface**

This command displays the interface information for PIM-SM on the specified interface.

Syntax
show ip pimsm interface <slot/port>

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< slot/port > - Interface number.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Slot/Port: Valid slot and port number separated by a forward slash.
IP Address: This field indicates the IP address of the specified interface.
Subnet Mask: This field indicates the Subnet Mask for the IP address of the PIM interface.
Mode: This field indicates whether PIM-SM is enabled or disabled on the specified interface. This is a configured value. By default it is disabled.
Hello Interval: This field indicates the frequency at which PIM hello messages are transmitted on this interface. This is a configured value. By default, the value is 30 seconds.
CBSR Preference: This field shows the preference value for the local interface as a candidate bootstrap router. This is a configured value.
CRP Preference: This field shows the preference value as a candidate rendezvous point on this interface.
CBSR Hash Mask Length: This field shows the hash mask length to be advertised in bootstrap messages if this interface is elected as the bootstrap router. The value is used in the hash algorithm for selecting the RP for a particular group.

7.5.1.4 **show ip pimsm interface stats**

This command displays the statistical information for PIM-SM on the specified interface.

Syntax
show ip pimsm interface stats {<slot/port> | all}

< slot/port > - Interface number.

all - this command represents all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: Valid slot and port number separated by a forward slash.
IP Address: This field indicates the IP Address that represents the PIM-SM interface.

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Subnet Mask: This field indicates the Subnet Mask of this PIM-SM interface.
Designated Router: This indicates the IP Address of the Designated Router for this interface.
Neighbor Count: This field displays the number of neighbors on the PIM-SM interface.

7.5.1.5 **show ip pimsm neighbor**

This command displays the neighbor information for PIM-SM on the specified interface.

Syntax
show ip pimsm neighbor [<slot/port> | all]

< slot/port > - Interface number.

all - this command represents all interfaces.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Interface: Valid slot and port number separated by a forward slash.
IP Address: This field displays the IP Address of the neighbor on an interface.
Up Time: This field indicates the time since this neighbor has become active on this interface.
Expiry Time: This field indicates the expiry time of the neighbor on this interface.

7.5.1.6 **show ip pimsm rp**

This command displays the PIM information for candidate Rendezvous Points (RPs) for all IP multicast groups or for the specific <group-address> <group-mask> provided in the command. The information in the table is displayed for each IP multicast group.

Syntax
show ip pimsm rp {<group-address> <group-mask> | candidate | all}

< group-address > - the IP multicast group address.

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< group-mask > - the multicast group address mask.

candidate - this command display PIM-SM candidate-RP table information.

all - this command display all group addresses.

Default Setting

None

Command Mode

Privileged Exec

Display Message

Group Address: This field specifies the IP multicast group address.
Group Mask: This field specifies the multicast group address subnet mask.
Address: This field displays the IP address of the Candidate-RP.
Hold Time: This field displays the hold time of a Candidate-RP.
Expiry Time: This field displays the minimum time remaining before the Candidate-RP will be declared down.
Component: This field displays a number which uniquely identifies the component. Each protocol instance connected to a separate domain should have a different index value.

If the "**candidate"** parameter is specified the follow fields are displayed:
Group Address: This field specifies the IP multicast group address.
Group Mask: This field specifies the multicast group address subnet mask.
Address: This field displays the IP address of the Candidate-RP.

7.5.1.7 **show ip pimsm rphash**

This command displays the RP router that will be selected from the set of active RP routers. The RP router, for the group, is selected by using the hash algorithm defined in RFC 2362.

Syntax
show ip pimsm rphash <group-address>

< group-address > - the IP multicast group address.

Default Setting

None

Command Mode

Privileged Exec

Display Message

IP Address: This field displays the IP address of the RP.

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Group Mask: This field displays the group mask for the group address.

7.5.1.8 **show ip pimsm staticrp**

This command displays the static RP information for the PIM-SM router.

Syntax
show ip pimsm staticrp

Default Setting

None

Command Mode

Privileged Exec

Display Message

Address: This field displays the IP address of the RP.
Group Address: This field displays the group address supported by the RP.
Group Mask: This field displays the group mask for the group address.

7.5.2 *Configuration Commands*

7.5.2.1 **ip pimsm**

This command sets administrative mode of PIM-SM multicast routing across the router to enabled. IGMP must be enabled before PIM-SM can be enabled.

Syntax
ip pimsm
no ip pimsm

no - This command sets administrative mode of PIM-SM multicast routing across the router to disabled. IGMP must be enabled before PIM-SM can be enabled.

Default Setting

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Disbaled

Command Mode

Global Config

7.5.2.2 ip pimsm message-interval

This command is used to configure the global join/prune interval for PIM-SM router. The join/prune interval is specified in seconds. This parameter can be configured to a value from 10 to 3600.

Syntax
ip pimsm message-interval <10 - 3600> **no ip pimsm message-interval**

<10 - 3600> - This is time interval in seconds.
no - This command is used to reset the global join/prune interval for PIM-SM router to the default value.

Default Setting

60

Command Mode

Global Config

7.5.2.3 ip pimsm register-rate-limit

This command is used to configure the Threshold rate for the RP router to switch to the shortest path. The rate is specified in Kilobytes per second. The possible values are 0 to 2000.

Syntax
ip pimsm register-rate-limit <0 - 2000> **no ip pimsm register-rate-limit**

<0 - 2000> - This is time interval in seconds.

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no - This command is used to reset the Threshold rate for the RP router to switch to the shortest path to the default value.

Default Setting

50

Command Mode

Global Config

7.5.2.4 ip pimsm spt-threshold

This command is used to configure the Threshold rate for the last-hop router to switch to the shortest path. The rate is specified in Kilobytes per second. The possible values are 0 to 2000.

Syntax
ip pimsm spt-threshold <0 - 2000> **no ip pimsm spt-threshold**

<0 - 2000> - This is time interval in seconds.
no - This command is used to reset the Threshold rate for the last-hop router to switch to the shortest path to the default value.

Default Setting

50

Command Mode

Global Config

7.5.2.5 ip pimsm staticrp

This command is used to create RP IP address for the PIM-SM router. The parameter <rp-address> is the IP address of the RP. The parameter <group-address> is the group address supported by the RP. The parameter <group-mask> is the group mask for the group address.

Syntax

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ip pimsm staticrp <rp-address> <group-address> <group-mask>

no ip pimsm staticrp <rp-address> <group-address> <group-mask>

< rp-address > - the IP Address of the RP.
< group-address > - the group address supported by the RP.
< group-mask > - the group mask for the group address.
no - This command is used to delete RP IP address for the PIM-SM router. The parameter <rp-address> is the IP address of the RP. The parameter <group-address> is the group address supported by the RP. The parameter <group-mask> is the group mask for the group address.

Default Setting

Disabled

Command Mode

Global Config

7.5.2.6 **ip pimsm mode**

This command sets administrative mode of PIM-SM multicast routing on a routing interface to enable.

Syntax

ip pimsm mode

no ip pimsm mode

no - This command sets administrative mode of PIM-SM multicast routing on a routing interface to disabled.

Default Setting

Disbaled

Command Mode

Interface Config

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7.5.2.7 **ip pimsm query-interval**

This command configures the transmission frequency of hello messages in seconds between PIM enabled neighbors. This field has a range of 10 to 3600 seconds.

Syntax
ip pimsm query-interval <10 - 3600>
no ip pimsm query-interval

<10 - 3600> - This is time interval in seconds.
no - This command resets the transmission frequency of hello messages between PIM enabled neighbors to the default value.

Default Setting

30

Command Mode

Interface Config

7.5.2.8 **ip pimsm cbsrpreference**

This command is used to configure the CBSR preference for a particular PIM-SM interface. The range of CBSR preference is –1 to 255.

Syntax
ip pimsm cbsrpreference <-1 - 255>
no ip pimsm cbsrpreference

<-1 - 255> - The preference value for the local interface.
no - This command is used to reset the CBSR preference for a particular PIM-SM interface to the default value.

Default Setting

0

Command Mode

Interface Config

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7.5.2.9 **ip pimsm cbsrhashmasklength**

This command is used to configure the CBSR hash mask length to be advertised in bootstrap messages for a particular PIM-SM interface. This hash mask length will be used in the hash algorithm for selecting the RP for a particular group. The valid range is 0 - 32. The default value is 30.

Syntax
ip pimsm cbsrhashmasklength <0 - 32> **no ip pimsm cbsrhashmasklength**

<0 - 32> - The CBSR hash mask length.
no - This command is used to reset the CBSR hash mask length for a particular PIM-SM interface to the default value.

Default Setting

30

Command Mode

Interface Config

7.5.2.10 **ip pimsm crppreference**

This command is used to configure the Candidate Rendezvous Point (CRP) for a particular PIM-SM interface. The valid values are from (-1 to 255), and the value of -1 is used to indicate that the local interface is not a Candidate RP interface.

The active router interface, with the highest IP Address and crppreference greater than -1, is chosen as the CRP for the router. The default value is 0.

In the CRP advertisements sent to the bootstrap router (BSR), the router interface advertises itself as the CRP for the group range 224.0.0.0 mask 240.0.0.0.

Syntax
ip pimsm crppreference <-1 - 255> **no ip pimsm crppreference**

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<-1 - 255> - The preference value for the local interface.
no - This command is used to reset the Candidate Rendezvous Point (CRP) for a particular PIM-SM interface to the default value.

Default Setting

0

Command Mode

Interface Config

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8 Web-Based Management Interface

8.1 Overview

Your Layer 3 Network Switch provides a built-in browser software interface that lets you configure and manage it remotely using a standard Web browser such as Microsoft Internet Explorer or Netscape Navigator. This software interface also allows for system monitoring and management of the Network Switch. When you configure this Network Switch for the first time from the console, you have to assign an IP address and subnet mask to the Network Switch. Thereafter, you can access the Network Switch's Web software interface directly using your Web browser by entering the switch's IP address into the address bar. In this way, you can use your Web browser to manage the Switch from any remote PC station, just as if you were directly connected to the Network Switch's console port.

The 6 menu options available are: **System**, **Switching**, **Routing, Security**, **QOS** and **IP Multicast**.

1. **System Menu:** This section provides information for configuring switch interface (port), SNMP and trap manager, Ping, DHCP client, SNTP, system time, defining system parameters including telnet session and console baud rate, etc, downloading switch module software, and resetting the switch module, switch statistics and Layer 2 Mac address.
2. **Switching Menu:** This section provides users to configure switch Port-Based VLAN, Protocol-Based VLAN, GARP, IGMP Snooping, Port Channel, Spanning Tree, and 802.1p priority Mapping and port security.
3. **Routing Menu:** This section provides users to configure OSPF, RIP, Router Discovery, Static Route, VLAN Routing, VRRP, BOOTP/DHCP relay, and DNS relay.
4. **Security Menu:** This section provides users to configure switch securities including 802.1x, Radius, TACACS, IP filter, Secure Http, and Secure Shell.
5. **QOS Menu:** This section provides users to configure Access Control Lists, Differentiated Service, and Class of Service.
6. **IP Multicast Menu:** This section provides users to configure DVMRP, IGMP, Multicast, PIM-DM, PIM-SM. It also provides information for a multicast distribution tree.

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8.2 Main Menu

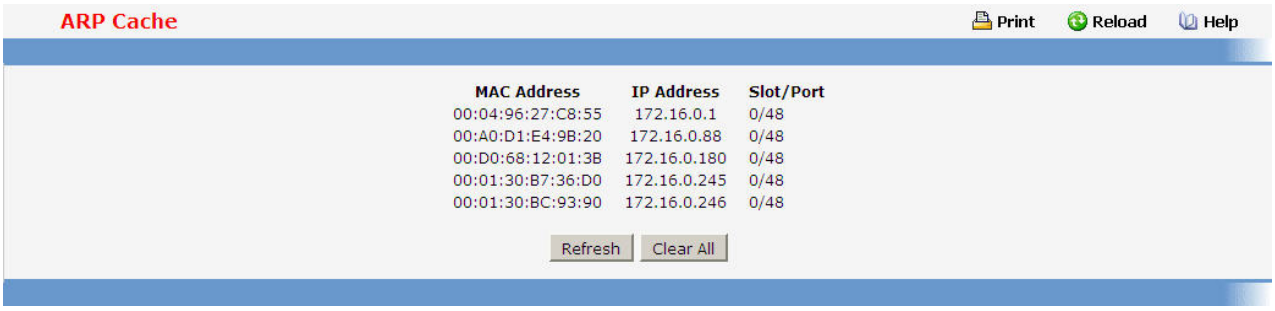
8.2.1 *System Menu*

8.2.1.1 **View ARP Cache**

The Address Resolution Protocol (ARP) dynamically maps physical (MAC) addresses to Internet (IP) addresses. This panel displays the current contents of the ARP cache.

For each connection, the following information is displayed:

- The physical (MAC) Address
- The associated IP address
- The identification of the port being used for the connection



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8.2.1.2 **Viewing Inventory Information**

Use this panel to display the switch's Vital Product Data, stored in non-volatile memory at the factory.

Non-Configurable Data

System Description - The product name of this switch.

Machine Type - The machine type of this switch.

Machine Model - The model within the machine type.

Serial Number - The unique box serial number for this switch.

Part Number - The manufacturing part number.

Base MAC Address - The burned-in universally administered MAC address of this switch.

Hardware Version - The hardware version of this switch. It is divided into four parts. The first byte is the major version and the second byte represents the minor version.

Loader Version - The release-version maintenance number of the loader code currently running on the switch. For example, if the release was 1, the version was 2, and the maintenance number was 4, the format would be '1.2.4'.

Boot Rom Version - The release-version maintenance number of the boot rom code currently running on the switch. For example, if the release was 1, the version was 2, and the maintenance number was 4, the format would be '1.2.4'.

Label Revision Number - The label revision serial number of this switch is used for manufacturing purpose.

Runtime Version - The release-version maintenance number of the code currently running on the switch. For example, if the release was 1, the version was 2, and the maintenance number was 4, the format would be '1.2.4'.

Operating System - The operating system currently running on the switch.

Network Processing Device - Identifies the network processor hardware.

Gigabit Ethernet Compliance Codes - Transceiver's compliance codes.

Vendor Name - The SFP transceiver vendor name shall be the full name of the corporation, a commonly accepted abbreviation of the name of the corporation, the SCSI company code for the corporation, or the stock exchange code for the corporation.

Vendor Part Number - Part number provided by SFP transceiver vendor.

Vendor Serial Number - Serial number provided by vendor.

Vendor Revision Number - Revision level for part number provided by vendor.

Vendor Manufacturing Date - Identifies the network processor hardware.

Temperature – The temperature of the switch

FAN 1 Status – The status of FAN 1. It is active or inactive.

FAN 2 Status – The status of FAN 2. It is active or inactive.

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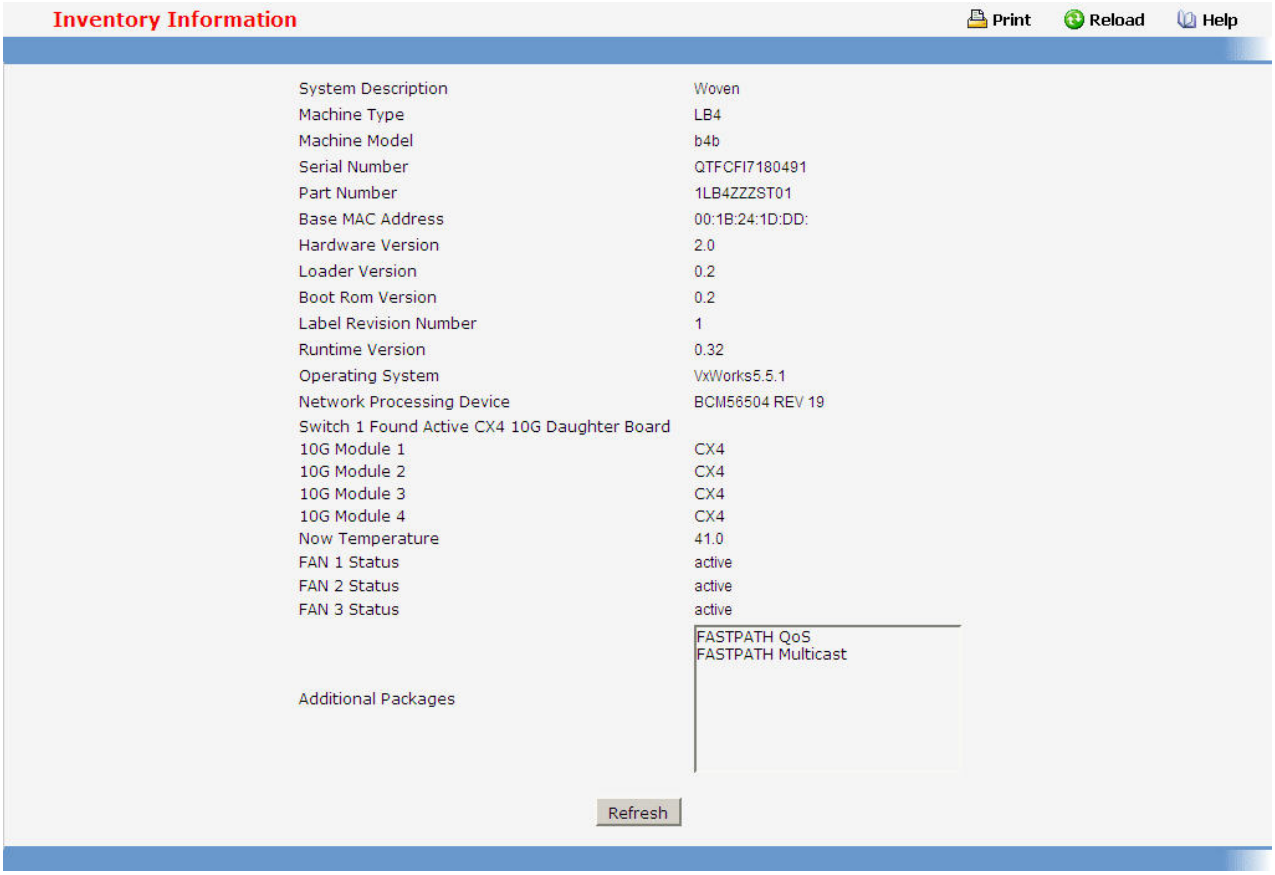
Additional Packages - A list of the optional software packages installed on the switch, if any.

Command Buttons

Refresh - Updates the information on the page.



8.2.1.3 Configuring Management Session and Network Parameters

Viewing System Description Page

Configurable Data

System Name - Enter the name you want to use to identify this switch. You may use up to 31 alpha-numeric characters. The factory default is blank.

System Location - Enter the location of this switch. You may use up to 31 alpha-numeric characters. The factory default is blank.

System Contact - Enter the contact person for this switch. You may use up to 31 alpha-numeric characters. The factory default is blank.

Non-Configurable Data

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System Description - The product name of this switch.

System Object ID - The base object ID for the switch's enterprise MIB.

System IP Address - The IP Address assigned to the network interface.

System Up time - The time in days, hours and minutes since the last switch reboot.

MIBs Supported - The list of MIBs supported by the management agent running on this switch.

Command Buttons

Submit - Update the switch with the values on the screen. If you want the switch to retain the new values across a power cycle you must perform a save.

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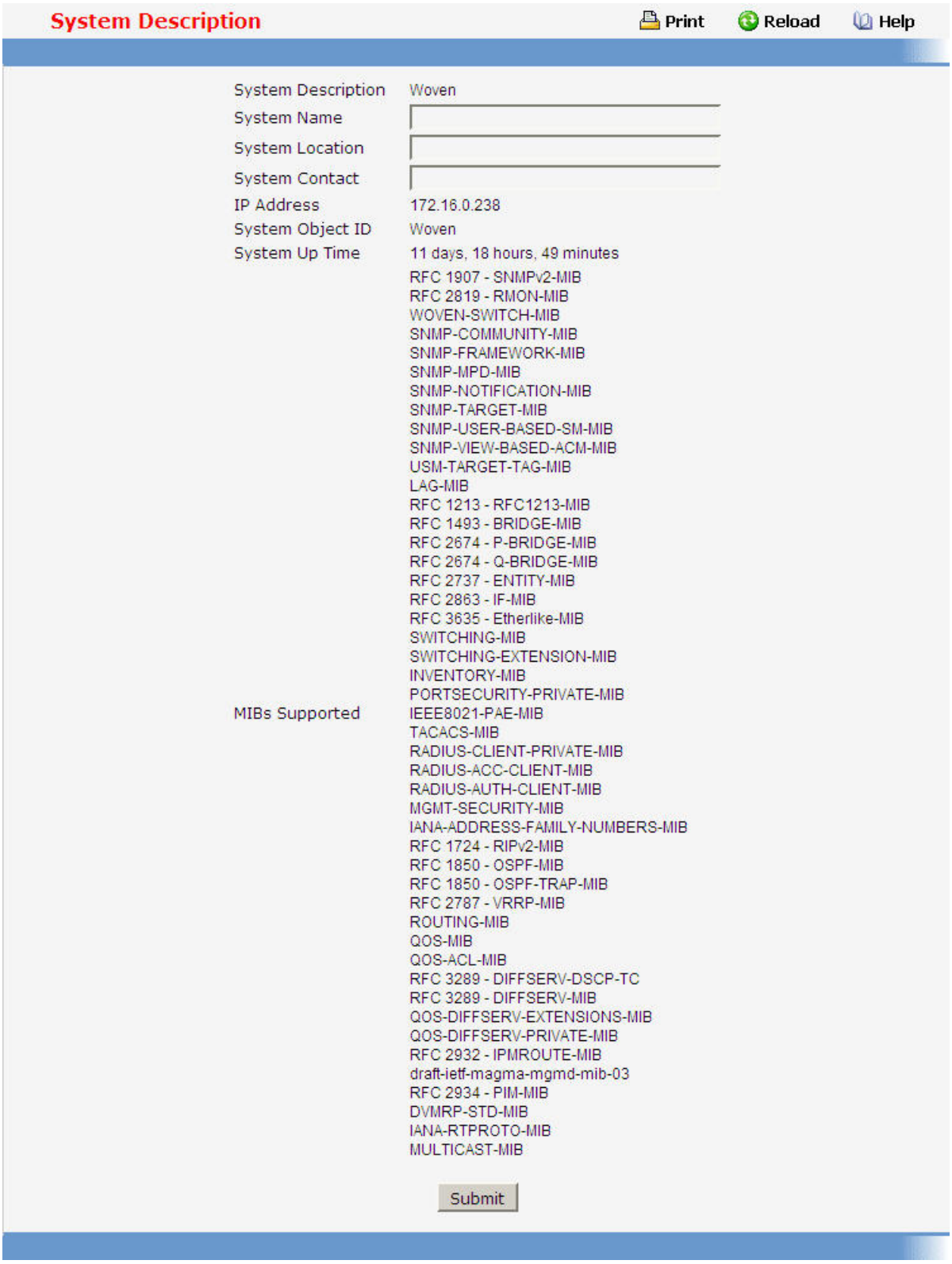

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Configuring Network Connectivity Page

The network interface is the logical interface used for in-band connectivity with the switch via any of the switch's front panel ports. The configuration parameters associated with the switch's network interface do not affect the configuration of the front panel ports through which traffic is switched or routed.

To access the switch over a network you must first configure it with IP information (IP address, subnet mask, and default gateway). You can configure the IP information using any of the following:

BOOTP

DHCP

Terminal interface via the EIA-232 port

Once you have established in-band connectivity, you can change the IP information using any of the following:

Terminal interface via the EIA-232 port

Terminal interface via telnet

SNMP-based management

Web-based management

Configurable Data

IP Address - The IP address of the interface. The factory default value is 0.0.0.0

Subnet Mask - The IP subnet mask for the interface. The factory default value is 0.0.0.0

Default Gateway - The default gateway for the IP interface. The factory default value is 0.0.0.0

Network Configuration Protocol Current - Choose what the switch should do following power-up: transmit a Bootp request, transmit a DHCP request, or do nothing (none). The factory default is None.

You cannot make this choice for both the network configuration protocol and the service port. You will only be given the choices for Bootp or DHCP here if the service port protocol is configured to None.

Management VLAN ID - Specifies the management VLAN ID of the switch. It may be configured to any value in the range of 1 - 4054. The management VLAN is used for management of the switch. This field is configurable for administrative users and read-only for other users.

Web Mode - Specify whether the switch may be accessed from a Web browser. If you choose to enable web mode you will be able to manage the switch from a Web browser. The factory default is enabled.

Java Mode - Enable or disable the java applet that displays a picture of the switch at the top right of the screen. If you run the applet you will be able to click on the picture of the switch to select configuration screens instead of using the navigation tree at the left side of the screen. The factory default is enabled.

Web Port - This field is used to set the HTTP Port Number. The value must be in the range of 1 to 65535. Port 80 is the default value. The currently configured value is shown when the web page is displayed.

Non-Configurable Data

Burned-in MAC Address - The burned-in MAC address used for in-band connectivity if you choose not to configure a locally administered address.

Command Buttons

Submit - Update the switch with the values on the screen. If you want the switch to retain the new values across a power cycle you must perform a save.

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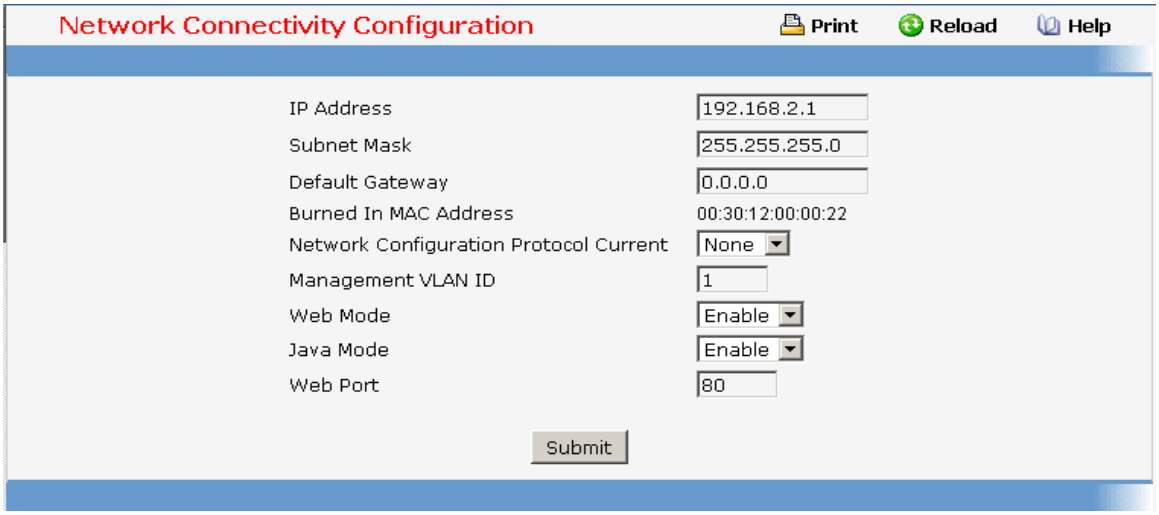

Configuring Telnet Session Page

Configurable Data

Telnet Session Timeout (minutes) - Specify how many minutes of inactivity should occur on a telnet session before the session is logged off. You may enter any number from 1 to 160. The factory default is 5.

Maximum Number of Telnet Sessions - Use the pulldown menu to select how many simultaneous telnet sessions will be allowed. The maximum is 5, which is also the factory default.

Allow New Telnet Sessions - If you set this to no, new telnet sessions will not be allowed. The factory default is yes.

Password Threshold - When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes. The default value is 3.

Command Buttons

Submit - Update the switch with the values on the screen. If you want the switch to retain the new values across a power cycle you must perform a save.

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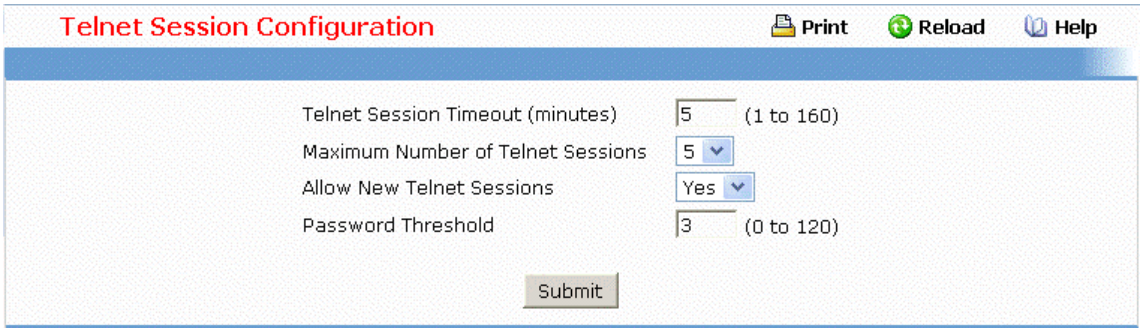


Configuring Outbound Telnet Client Configuration Page

Configurable Data

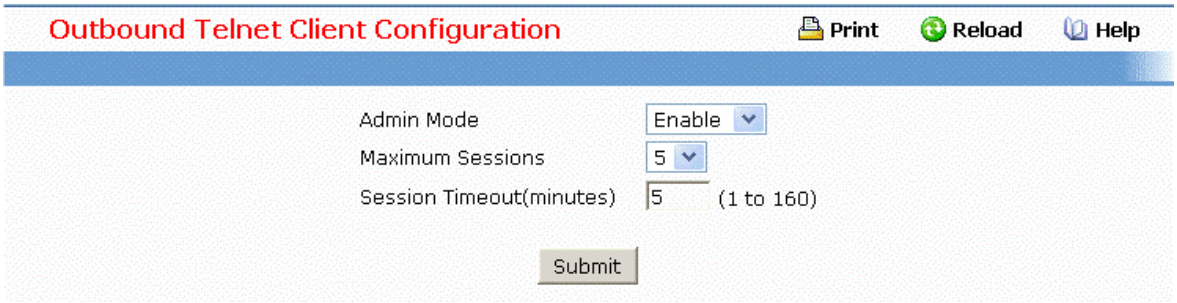
Admin Mode - Specifies if the Outbound Telnet service is Enabled or Disabled. Default value is Enabled.

Maximum Sessions - Specifies the maximum number of Outbound Telnet Sessions allowed. Default value is 5. Valid Range is (0 to 5).

Session Timeout - Specifies the Outbound Telnet login inactivity timeout. Default value is 5. Valid Range is (1 to 160).

Command Buttons

Submit - Sends the updated configuration to the switch. Configuration changes take effect immediately.



Configuring Serial Port Page

Configurable Data

Serial Port Login Timeout (minutes) - Specify how many minutes of inactivity should occur on a serial port connection before the switch closes the connection. Enter a number between 0 and 160: the factory default is 5. ***Entering 0 disables the timeout.***

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Baud Rate (bps) - Select the default baud rate for the serial port connection from the pull-down menu. You may choose from 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 baud. The factory default is 9600 baud.

Password Threshold - When the logon attempt threshold is reached on the console port, the system interface becomes silent for a specified amount of time before allowing the next logon attempt. (Use the silent time command to set this interval.) When this threshold is reached for Telnet, the Telnet logon interface closes. The default value is 3.

Silent Time (Sec) - Use this command to set the amount of time the management console is inaccessible after the number of unsuccessful logon attempts exceeds the threshold set by the password threshold command. The default value is 0.

Non-Configurable Data

Character Size (bits) - The number of bits in a character. This is always 8.

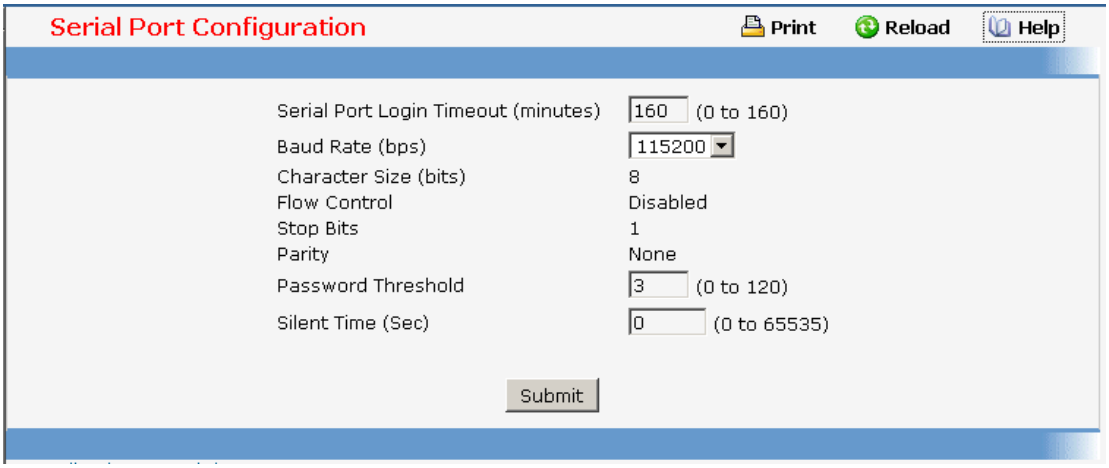
Flow Control - Whether hardware flow control is enabled or disabled. It is always disabled.

Parity - The parity method used on the serial port. It is always None.

Stop Bits - The number of stop bits per character. It is always 1.

Command Buttons

Submit - Update the switch with the values on the screen. If you want the switch to retain the new values across a power cycle you must perform a save.



Defining User Accounts Page

By default, two user accounts exist:

admin, with 'Read/Write' privileges

guest, with 'Read Only' privileges

By default, both of these accounts have blank passwords. The names are not case sensitive.

If you logon with a user account with 'Read/Write' privileges (that is, as admin) you can use the User Accounts screen to assign passwords and set security parameters for the default accounts, and to add and delete accounts (other than admin) up to the maximum of six. Only a user with 'Read/Write' privileges may alter data on this screen, and only one account may be created with 'Read/Write' privileges.

Selection Criteria

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User Name Selector - You can use this screen to reconfigure an existing account, or to create a new one. Use this pulldown menu to select one of the existing accounts, or select 'Create' to add a new one, provided the maximum of five 'Read Only' accounts has not been reached.

Configurable Data

User Name - Enter the name you want to give to the new account. (You can only enter data in this field when you are creating a new account.) User names are up to eight characters in length and are not case sensitive. Valid characters include all the alphanumeric characters as well as the dash ('-') and underscore ('_') characters.

Password - Enter the optional new or changed password for the account. It will not display as it is typed, only asterisks (*) will show. Passwords are up to eight alpha numeric characters in length, and are case sensitive.

Confirm Password - Enter the password again, to confirm that you entered it correctly. This field will not display, but will show asterisks (*).

Authentication Protocol - Specify the SNMPv3 Authentication Protocol setting for the selected user account. The valid Authentication Protocols are None, MD5 or SHA. If you select None, the user will be unable to access the SNMP data from an SNMP browser. If you select MD5 or SHA, the user login password will be used as the SNMPv3 authentication password, and you must therefore specify a password, and it must be eight characters.

Encryption Protocol - Specify the SNMPv3 Encryption Protocol setting for the selected user account. The valid Encryption Protocols are None or DES. If you select the DES Protocol you must enter a key in the Encryption Key field. If None is specified for the Protocol, the Encryption Key is ignored.

Encryption Key - If you selected DES in the Encryption Protocol field enter the SNMPv3 Encryption Key here. Otherwise this field is ignored. Valid keys are 8 to 64 characters. The Apply checkbox must be checked in order to change the Encryption Protocol and Encryption Key.

Non-Configurable Data

Access Mode - Indicates the user's access mode. The admin account always has 'Read/Write' access, and all other accounts have 'Read Only' access.

SNMP v3 Access Mode - Indicates the SNMPv3 access privileges for the user account. The admin account always has 'Read/Write' access, and all other accounts have 'Read Only' access.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected user account. If you want the switch to retain the new values across a power cycle, you must perform a save. This button is only visible when you have selected a user account with 'Read Only' access. You cannot delete the 'Read/Write' user.

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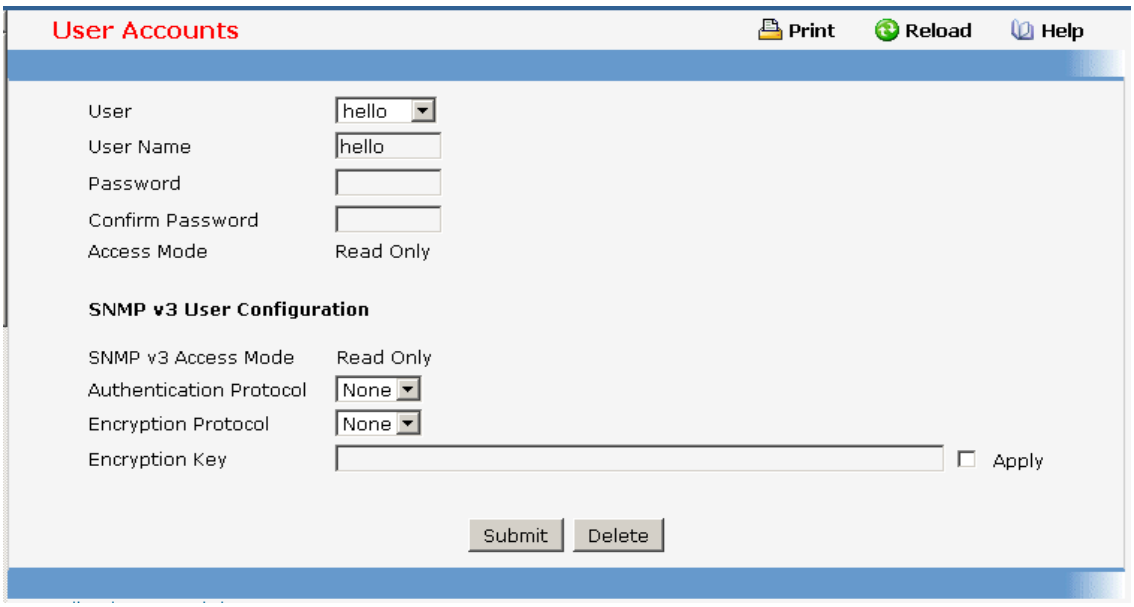

Defining Authentication List Configuration Page

You use this screen to configure login lists. A login list specifies the authentication method(s) you want used to validate switch or port access for the users associated with the list. The pre-configured users, admin and guest, are assigned to a pre-configured list named defaultList, which you may not delete. All newly created users are also assigned to the defaultList until you specifically assign them to a different list

Selection Criteria

Authentication List - Select the authentication login list you want to configure. Select 'create' to define a new login list. When you create a new login list, 'local' is set as the initial authentication method.

Configurable Data

Authentication List Name - If you are creating a new login list, enter the name you want to assign. It can be up to 15 alphanumeric characters and is not case sensitive.

Method 1 - Use the dropdown menu to select the method that should appear first in the selected authentication login list. If you select a method that does not time out as the first method, such as 'local' no other method will be tried, even if you have specified more than one method. Note that this parameter will not appear when you first create a new login list. The options are:

Local- the user's locally stored ID and password will be used for authentication

Radius- the user's ID and password will be authenticated using the RADIUS server instead of locally

Reject- the user is never authenticated

Tacacs- the user's ID and password will be authenticated using the TACACS server instead of locally

Undefined- the authentication method is unspecified (this may not be assigned as the first method)

Method 2 - Use the dropdown menu to select the method, if any, that should appear second in the selected authentication login list. This is the method that will be used if the first method times out. If you

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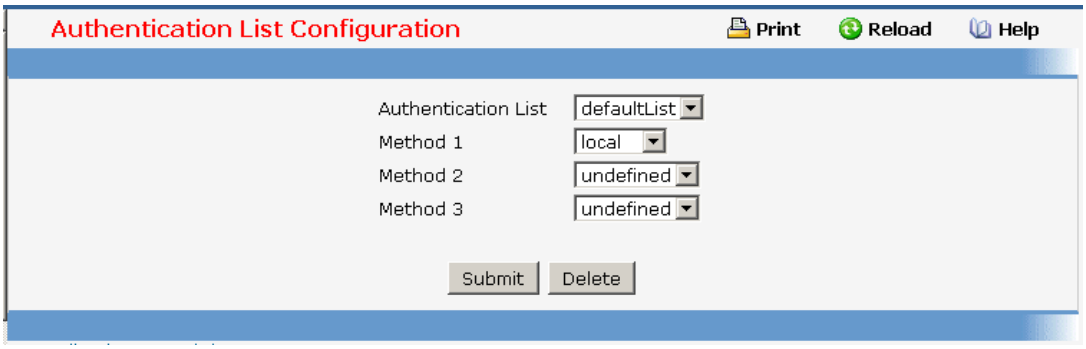
select a method that does not time out as the second method, the third method will not be tried. Note that this parameter will not appear when you first create a new login list.

Method 3 - Use the dropdown menu to select the method, if any, that should appear third in the selected authentication login list. Note that this parameter will not appear when you first create a new login list.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch. These changes will not be retained across a power cycle unless you perform a save.

Delete - Remove the selected authentication login list from the configuration. The delete will fail if the selected login list is assigned to any user (including the default user) for system login or IEEE 802.1x port access control. You can only use this button if you have Read/Write access. The change will not be retained across a power cycle unless you perform a save.



Viewing Login Session Page

Non-Configurable Data

ID - Identifies the ID of this row.

User Name - Shows the user name of user who made the session.

Connection From - Shows the IP from which machine the user is connected.

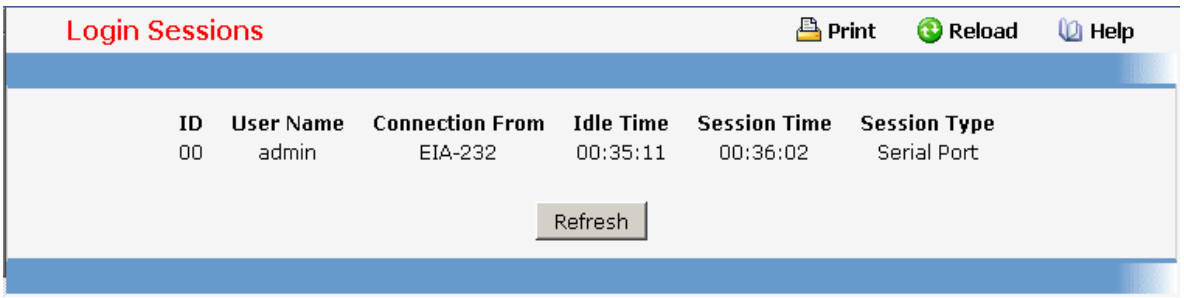
Idle Time - Shows the idle session time.

Session Time - Shows the total session time.

Session Type – Shows the type of session: telnet, serial or SSH.

Command Buttons

Refresh - Update the information on the page.



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Viewing Authentication List Summary Page

Non-Configurable Data

Authentication List - Identifies the authentication login list summarized in this row.

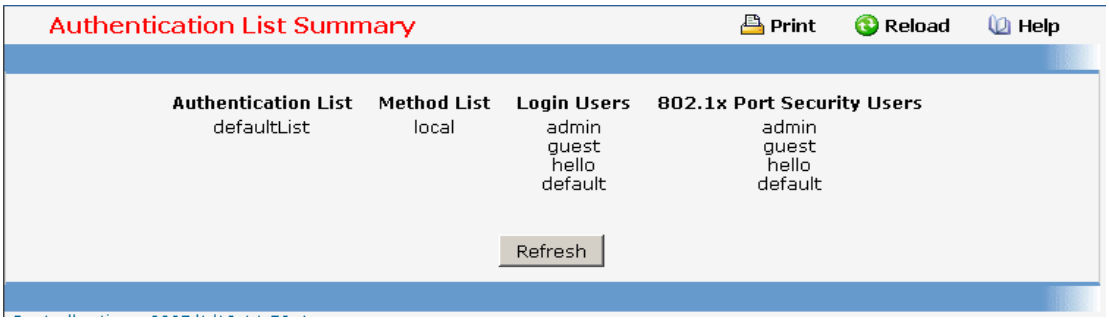
Method List - The ordered list of methods configured for this login list.

Login Users - The users you assigned to this login list on the User Login Configuration screen. This list is used to authenticate the users for system login access.

802.1x Port Security Users The users you assigned to this login list on the Port Access Control User Login Configuration screen - This list is used to authenticate the users for port access, using the IEEE 802.1x protocol.

Command Buttons

Refresh - Update the information on the page.



Defining User Login Page

Note: This page provides a user account (from those already created) to be added into the Authentication List.

Each configured user is assigned to a login list that specifies how the user should be authenticated when attempting to access the switch or a port on the switch. After creating a new user account on the User Account screen, you should assign that user to a login list for the switch using this screen and, if necessary, to a login list for the ports using the Port Access Control User Login Configuration screen. If you need to create a new login list for the user, you would do so on the Login Configuration screen.

The pre-configured users, admin and guest, are assigned to a pre-configured list named defaultList, which you may not delete. All newly created users are also assigned to the defaultList until you specifically assign them to a different list.

A user that does not have an account configured on the switch is termed the 'default' or 'non-configured' user. If you assign the 'non-configured user' to a login list that specifies authentication via the RADIUS server, you will not need to create an account for all users on each switch. However, by default the 'non-configured user' is assigned to 'defaultList', which by default uses local authentication.

Selection Criteria

User - Select the user you want to assign to a login list. Note that you must always associate the admin user with the default list. This forces the admin user to always be authenticated locally to prevent full lockout from switch configuration. If you assign a user to a login list that requires remote authentication,

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the user's access to the switch from all CLI, web, and telnet sessions will be blocked until the authentication is complete. Refer to the discussion of maximum delay in the RADIUS configuration help.

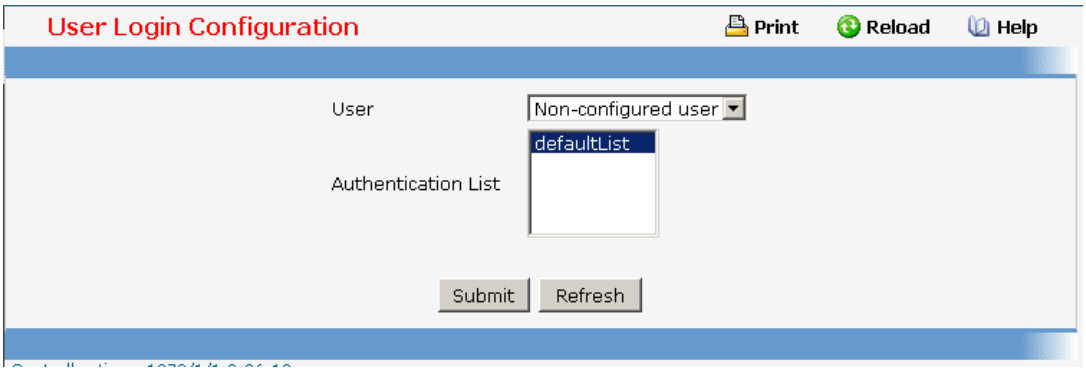
Configurable Data

Authentication List - Select the authentication login list you want to assign to the user for system login.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch. These changes will not be retained across a power cycle unless you perform a save.

Refresh - Updates the information on the page.



8.2.1.4 **Defining Forwarding Database**

Configuring MAC Table aging interval time Page

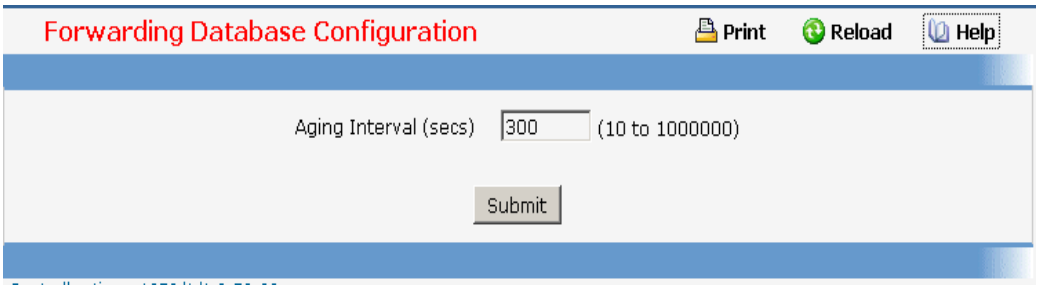
Use this panel to set the Address Ageing Timeout for the forwarding database.

Configurable Data

Address Ageing Timeout (seconds) - The forwarding database contains static entries, which are never aged out, and dynamically learned entries, which are removed if they are not updated within a given time. You specify that time by entering a value for the Address Ageing Timeout. You may enter any number of seconds between 10 and 1000000. IEEE 802.1D recommends a default of 300 seconds, which is the factory default.

Command Buttons

Submit - Update the switch with the values on the screen. If you want the switch to retain the new values across a power cycle you must perform a save.



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Viewing Forwarding Database Page

Use this panel to display information about entries in the forwarding database. These entries are used by the transparent bridging function to determine how to forward a received frame.

Configurable Data

Filter - Specify the entries you want displayed.

Learned: If you choose "learned" only MAC addresses that have been learned will be displayed.

All: If you choose "all" the whole table will be displayed.

MAC Address Search - You may also search for an individual MAC address. Enter the two byte hexadecimal VLAN ID followed by the six byte hexadecimal MAC address in two-digit groups separated by colons, for example 01:23:45:67:89:AB:CD:EF where 01:23 is the VLAN ID and 45:67:89:AB:CD:EF is the MAC address. Then click on the search button. If the address exists, that entry will be displayed as the first entry followed by the remaining (greater) MAC addresses. An exact match is required.

Non-Configurable Data

MAC Address - A unicast MAC address for which the switch has forwarding and/or filtering information. The format is a two byte hexadecimal VLAN ID number followed by a six byte MAC address with each byte separated by colons. For example: 01:23:45:67:89:AB:CD:EF, where 01:23 is the VLAN ID and 45:67:89:AB:CD:EF is the MAC address.

Source Slot/Port - the port where this address was learned -- that is, the port through which the MAC address can be reached.

ifIndex - The ifIndex of the MIB interface table entry associated with the source port.

Status - The status of this entry. The possible values are:

Static: the entry was added when a static MAC filter was defined.

Learned: the entry was learned by observing the source MAC addresses of incoming traffic, and is currently in use.

Management: the system MAC address, which is identified with interface 0.1.

Self: the MAC address of one of the switch's physical interfaces.

Command Buttons

Search - Search for the specified MAC address.

Refresh - Refetch the database and display it again starting with the first entry in the table.

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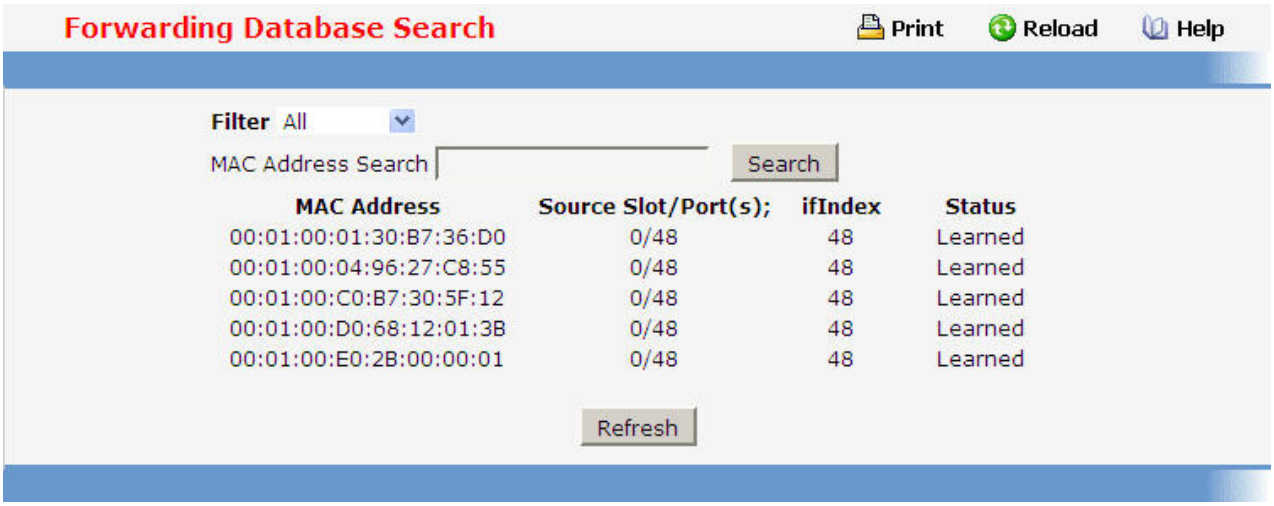


8.2.1.5 **Viewing Logs**

Viewing Buffered Log Configuration Page

This log stores messages in memory based upon the settings for message component and severity.

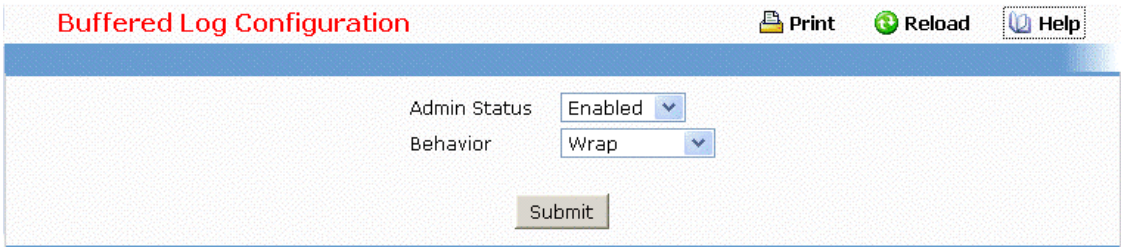
Configurable Data

Admin Status - A log that is "Disabled" shall not log messages. A log that is "Enabled" shall log messages. Enable or Disable logging by selecting the corresponding line on the pulldown entry field.

Behavior Indicates the behavior of the log when it is full. It can either wrap around or stop when the log space is filled.

Command Buttons

Submit - Update the switch with the values you entered.



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Viewing Buffered Log Page

This help message applies to the format of all logged messages which are displayed for the buffered log, persistent log, or console log.

Format of the messages

<15>Aug 24 05:34:05 STK0 MSTP[2110]: mspt_api.c(318) 237 %% Interface 12 transitioned to root state on message age timer expiry
-The above example indicates a user-level message (1) with severity 7 (debug) generated by component MSTP running in thread id 2110 on Aug 24 05:34:05 by line 318 of file mstp_api.c. This is the 237th message logged. Messages logged to a collector or relay via syslog have an identical format to the above message.

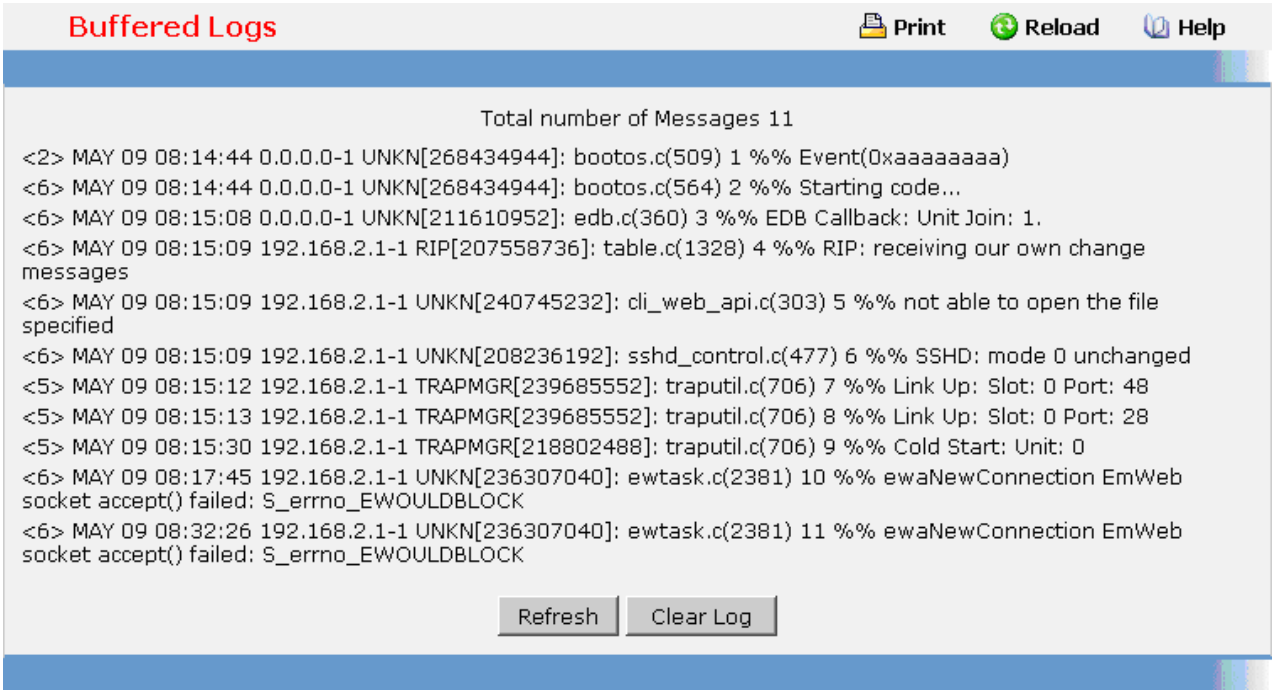
Note for buffered log

Number of log messages displayed: For the buffered log, only the latest 128 entries are displayed on the webpage

Command Buttons

Refresh - Refresh the page with the latest log entries.

Clear Log - Clear all entries in the log.


Buffered Logs
Print
Reload
Help
Total number of Messages 11
<2> MAY 09 08:14:44 0.0.0.0-1 UNKN[268434944]: bootos.c(509) 1 %% Event(0xaaaaaaaa)
<6> MAY 09 08:14:44 0.0.0.0-1 UNKN[268434944]: bootos.c(564) 2 %% Starting code...
<6> MAY 09 08:15:08 0.0.0.0-1 UNKN[211610952]: edb.c(360) 3 %% EDB Callback: Unit Join: 1.
<6> MAY 09 08:15:09 192.168.2.1-1 RIP[207558736]: table.c(1328) 4 %% RIP: receiving our own change messages
<6> MAY 09 08:15:09 192.168.2.1-1 UNKN[240745232]: cli_web_api.c(303) 5 %% not able to open the file specified
<6> MAY 09 08:15:09 192.168.2.1-1 UNKN[208236192]: sshd_control.c(477) 6 %% SSHD: mode 0 unchanged
<5> MAY 09 08:15:12 192.168.2.1-1 TRAPMGR[239685552]: traputil.c(706) 7 %% Link Up: Slot: 0 Port: 48
<5> MAY 09 08:15:13 192.168.2.1-1 TRAPMGR[239685552]: traputil.c(706) 8 %% Link Up: Slot: 0 Port: 28
<5> MAY 09 08:15:30 192.168.2.1-1 TRAPMGR[218802488]: traputil.c(706) 9 %% Cold Start: Unit: 0
<6> MAY 09 08:17:45 192.168.2.1-1 UNKN[236307040]: ewtask.c(2381) 10 %% ewaNewConnection EmWeb socket accept() failed: S_errno_EWOULDBLOCK
<6> MAY 09 08:32:26 192.168.2.1-1 UNKN[236307040]: ewtask.c(2381) 11 %% ewaNewConnection EmWeb socket accept() failed: S_errno_EWOULDBLOCK
Refresh
Clear Log

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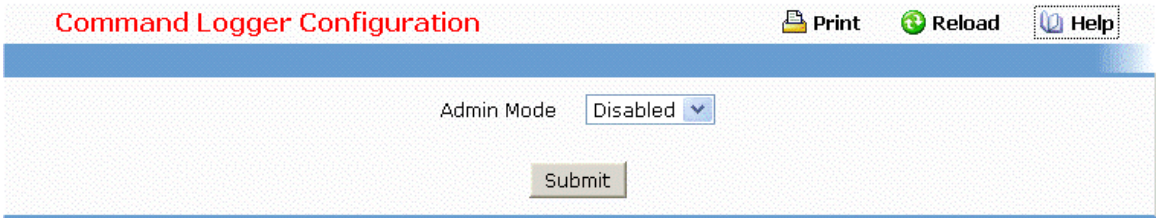
Configuring Command Logger Page

Configurable Data

Admin Mode - Enable/Disable the operation of the CLI Command logging by selecting the corresponding pulldown field and clicking Submit.

Command Buttons

Submit - Update the switch with the values you entered.



Configuring Console Log Page

This allows logging to any serial device attached to the host.

Configurable Data

Admin Status -A log that is "Disabled" shall not log messages. A log that is "Enabled" shall log messages. Enable or Disable logging by selecting the corresponding line on the pulldown entry field.

Severity Filter - A log records messages equal to or above a configured severity threshold. Select the severity option by selecting the corresponding line on the pulldown entry field. These severity levels have been enumerated below:
-Emergency (0): system is unusable
-Alert (1): action must be taken immediately
-Critical (2): critical conditions
-Error (3): error conditions
-Warning (4): warning conditions
-Notice(5): normal but significant conditions
-Informational(6): informational messages
-Debug(7): debug-level messages

Command Buttons

Submit - Update the switch with the values you entered.

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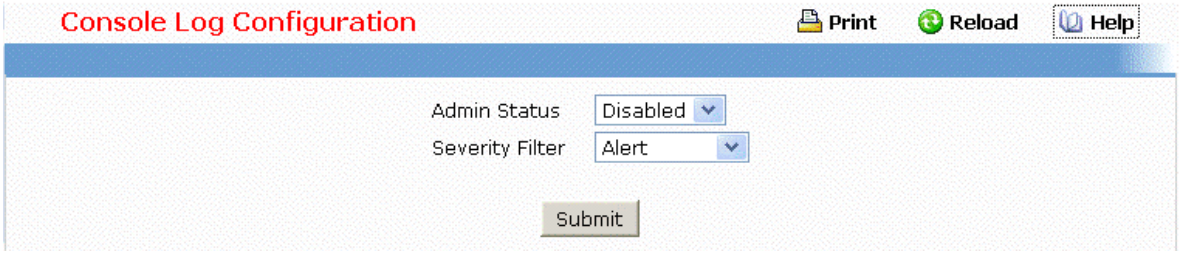


Viewing Event Log Page

Use this panel to display the event log, which is used to hold error messages for catastrophic events. After the event is logged and the updated log is saved in FLASH memory, the switch will be reset. The log can hold at least 2,000 entries (the actual number depends on the platform and OS), and is erased when an attempt is made to add an entry after it is full. The event log is preserved across system resets.

Non-Configurable Data

Entry - The number of the entry within the event log. The most recent entry is first.

Filename - The FASTPATH source code filename identifying the code that detected the event.

Line - The line number within the source file of the code that detected the event.

Task ID - The OS-assigned ID of the task reporting the event.

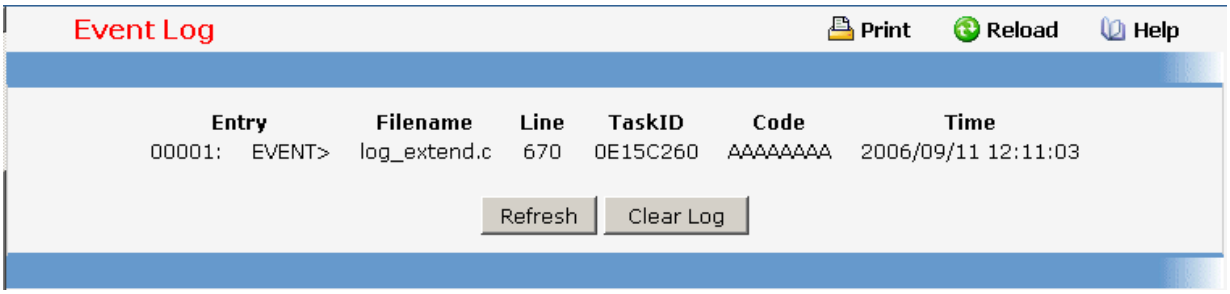
Code - The event code passed to the event log handler by the code reporting the event.

Time - The time the event occurred, measured from the previous reset.

Command Buttons

Refresh - Update the information on the page.

Clear Log - Remove all log information.



Configuring Hosts configuration Page

Configurable Data

Host - This is a list of the hosts that have been configured for syslog. Select a host for changing the configuration or choose to add a new hosts from the drop down list.

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IP Address - This is the ip address of the host configured for syslog.

Status -This specifies wether the host has been configured to be actively logging or not. Set the host to be active/out of service from the drop down menu.

Port -This is the port on the host to which syslog messages are sent. The default port is 514. Specify the port in the text field.

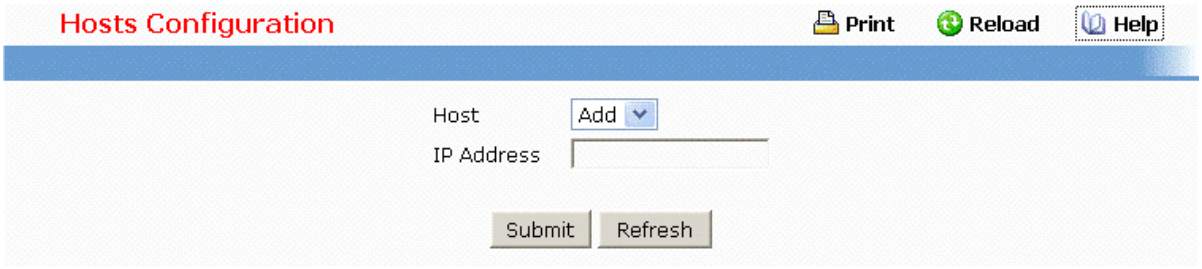
Severity Filter -A log records messages equal to or above a configured severity threshold. Select the severity option by selecting the corresponding line on the pulldown entry field. These severity levels have been enumerated below:
-Emergency (0): system is unusable
-Alert (1): action must be taken immediately
-Critical (2): critical conditions
-Error (3): error conditions
-Warning (4): warning conditions
-Notice(5): normal but significant conditions
-Informational(6): informational messages
-Debug(7): debug-level messages

Command Buttons

Submit - Update the switch with the values you entered.

Refresh - Refetch the database and display it again starting with the first entry in the table.

Delete - Delete a configured host.



Configuring syslog configuration Page

Configurable Data

Admin Status -For Enabling and Disabling logging to configured syslog hosts. Setting this to disable stops logging to all syslog hosts. Disable means no messages will be sent to any collector/relay. Enable means messages will be sent to configured collector/relays using the values configured for each collector/relay. Enable/Disable the operation of the syslog function by selecting the corresponding line on the pulldown entry field.

Local UDP Port This is the port on the local host from which syslog messages are sent. The default port is 514. Specify the local port in the text field.

Non-Configurable Data

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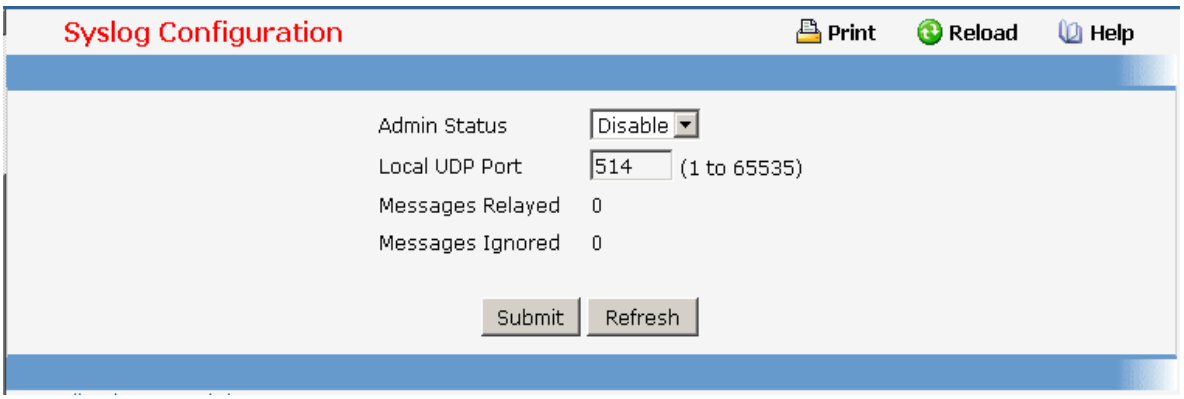
Messages Relayed - The count of syslog messages relayed.

Messages Ignored - The count of syslog messages ignored.

Command Buttons

Submit - Update the switch with the values you entered.

Refresh - Refetch the database and display it again starting with the first entry in the table.



8.2.1.6 **Managing Switch Interface**

Configuring Switch Interface Page

Selection Criteria

Slot/Port - Selects the interface for which data is to be displayed or configured.

Configurable Data

STP Mode - The Select the Spanning Tree Protocol Administrative Mode for the port or **LAG**. The possible values are:

Enable - select this to enable the Spanning Tree Protocol for this port.

Disable - select this to disable the Spanning Tree Protocol for this port.

Admin Mode - Use the pulldown menu to select the Port control administration state. You must select enable if you want the port to participate in the network. The factory default is enabled.

IPv6 Mode - Enable or disable the port to forward IPv6 packets.

LACP Mode - Selects the Link Aggregation Control Protocol administration state. The mode must be enabled in order for the port to participate in Link Aggregation. May be enabled or disabled by selecting the corresponding line on the pulldown entry field. The factory default is enabled.

Physical Mode - Use the pulldown menu to select the port's speed and duplex mode. If you select auto the duplex mode and speed will be set by the auto-negotiation process. Note that the port's maximum capability (full duplex and 100 Mbps) will be advertised. Otherwise, your selection will determine the port's duplex mode and transmission rate. The factory default is auto. The selection when applied against the "All" option in Slot/Port is applied to all applicable interfaces only.

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Link Trap - This object determines whether or not to send a trap when link status changes. The factory default is enabled.

Maximum Frame Size - The maximum Ethernet frame size the interface supports or is configured, including Ethernet header, CRC, and payload. (1518 to 9216). The default maximum frame size is 1518 .

Flow Control - Used to enable or disable flow control feature on the selected interface.

Broadcast Storm Control - Used to enable or disable the broadcast storm feature on the selected interface. The broadcast storm control value can be set to Level 1, Level 2, Level 3, and Level 4.

The following description is for the broadcast storm, multicast storm, and unicast storm control.

The actual packet rate for switch will convert from the input level and the speed of that interface. (see table 1 and table 2)

Table 1. For 10/100Mbps/1Gbps		Table 2. For 10Gbps	
Level	Packet Rate (pps)	Level	Packet Rate (pps)
1	64	1	1042
2	128	2	2048
3	256	3	3124
4	512	4	4167

Multicast Storm Control - Used to enable or disable the multicast storm feature on the selected interface. Multicast storm control value could be set Level 1, Level 2, Level 3, and Level 4.

Unicast Storm Control - Used to enable or disable unicast storm feature on the selected interface. Unicast storm control value could be set Level 1, Level 2, Level 3, and Level 4.

Capability - You could advertise the port capabilities of a given interface during auto-negotiation.

Non-Configurable Data

Port Type - For normal ports this field will be blank. Otherwise the possible values are:

Mon - the port is a monitoring port. Look at the Port Monitoring screens for more information.

LAG - the port is a member of a Link Aggregation trunk. Look at the LAG screens for more information.

Physical Status - Indicates the port speed and duplex mode.

Link Status - Indicates whether the Link is up or down.

ifIndex - The ifIndex of the interface table entry associated with this port.

Command Buttons

Submit - Update the switch with the values you entered. If you want the switch to retain the new values across a power cycle you must perform a save.

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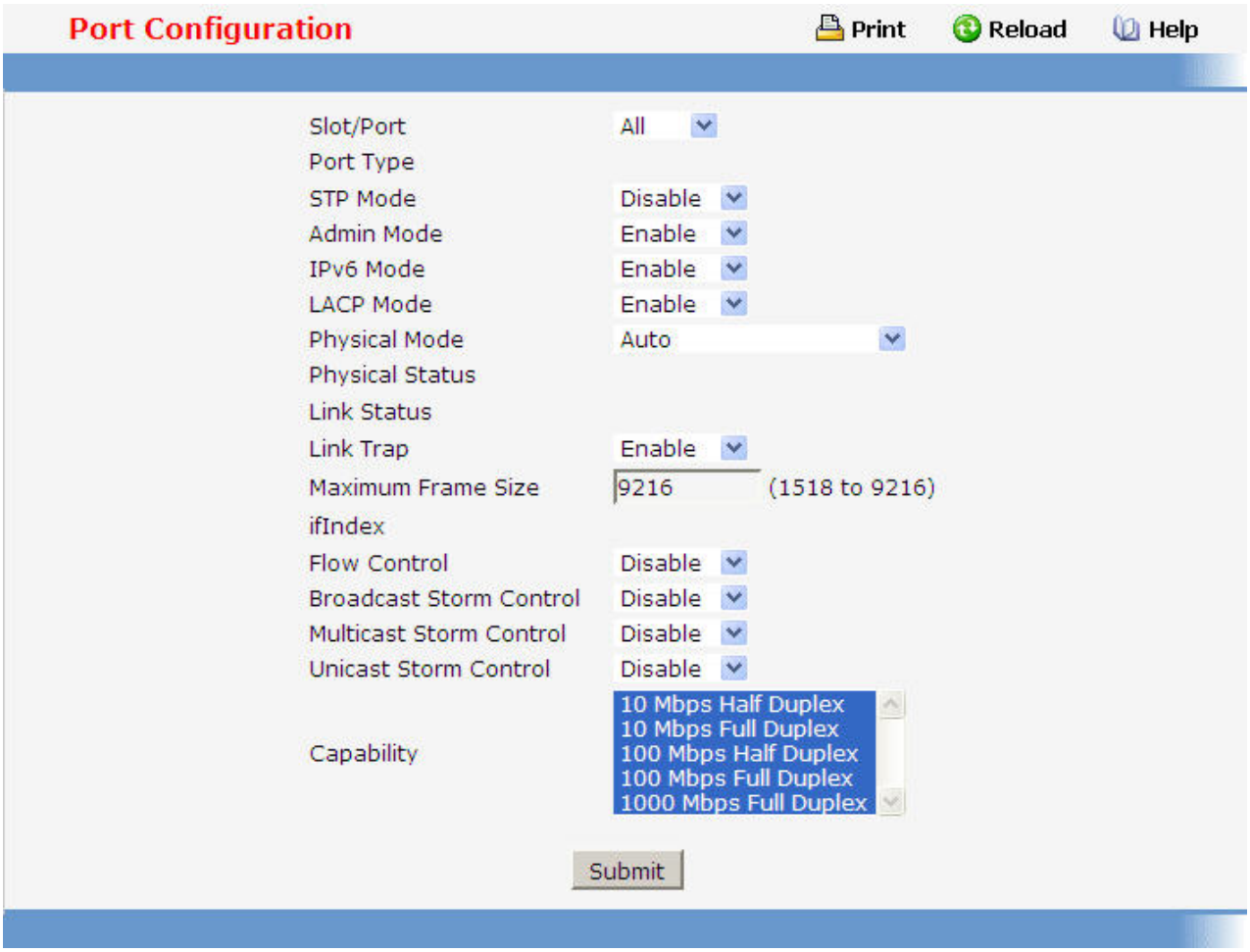

Viewing Switch Interface Configuration Page

This screen displays the status for all ports in the box.

Selection Criteria

MST ID - Select the Multiple Spanning Tree instance ID from the list of all currently configured MST ID's to determine the values displayed for the Spanning Tree parameters. Changing the selected MST ID will generate a screen refresh. If Spanning Tree is disabled this will be a static value, CST, instead of a selector.

Non-Configurable Port Status Data

Slot/Port - Identifies the port

Port Type - For normal ports this field will be blank. Otherwise the possible values are:

Mon - this port is a monitoring port. Look at the Port Monitoring screens for more information.

LAG - the port is a member of a Link Aggregation trunk. Look at the LAG screens for more information.

STP Mode - The Spanning Tree Protocol Administrative Mode associated with the port or LAG. The possible values are:

Enable - spanning tree is enabled for this port.

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Disable - spanning tree is disabled for this port.

Forwarding State - The port's current state Spanning Tree state. This state controls what action a port takes on receipt of a frame. If the bridge detects a malfunctioning port it will place that port into the broken state. The other five states are defined in IEEE 802.1D:

Disabled

Blocking

Listening

Learning

Forwarding

Broken

Port Role - Each MST Bridge Port that is enabled is assigned a Port Role for each spanning tree. The port role will be one of the following values: Root Port, Designated Port, Alternate Port, Backup Port, Master Port, or Disabled Port.

Admin Mode - The Port control administration state. The port must be enabled in order for it to be allowed into the network. The factory default is enabled.

LACP Mode - Indicates the Link Aggregation Control Protocol administration state. The mode must be enabled in order for the port to participate in Link Aggregation.

Physical Mode - Indicates the port speed and duplex mode. In auto-negotiation mode the duplex mode and speed are set from the auto-negotiation process.

Physical Status - Indicates the port speed and duplex mode.

Link Status - Indicates whether the Link is up or down.

Link Trap - Indicates whether or not the port will send a trap when link status changes.

ifIndex - Indicates the ifIndex of the interface table entry associated with this port.

Flow Control - Indicates the status of flow control on this port.

Packet Burst - Indicates the packet burst used in the rate limit function if the rate limit admin mode is enabled.

Broadcast Storm Control - Indicates the status of the broadcast storm control, disable or Level 1, Level 2, Level 3, Level 4.

Multicast Storm Control - Indicates the status of the multicast storm control, disable or Level 1, Level 2, Level 3, Level 4.

Unicast Storm Control - Indicates the status of the unicast storm control, disable or Level 1, Level 2, Level 3, Level 4.

Capability - Indicates the port capabilities during auto-negotiation.

Command Buttons

Refresh – Refresh the configuration value again.

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Port Summary

Print Reload Help

MST ID : CST

Slot/Port	Port Type	STP Mode	Forwarding State	Port Role	Admin Mode	IPv6 Mode	LACP Mode	Physical Mode
0/1		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/2		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/3		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/4		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/5		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/6		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/7		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/8		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/9		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/10		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/11		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/12		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/13		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/14		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/15		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/16		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/17		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/18		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/19		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/20		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/21		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/22		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/23		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/24		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/25		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/26		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/27		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/28		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/29		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/30		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/31		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/32		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/33		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/34		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/35		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/36		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/37		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/38		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/39		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/40		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/41		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/42		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/43		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/44		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/45		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/46		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/47		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/48		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/49		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto
0/50		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/51		Disabled	Disabled	Disabled	Enable	Enable	Enable	Auto
0/52		Disabled	Manual forwarding	Disabled	Enable	Enable	Enable	Auto

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Configuring Multiple Port Mirroring Function Page

Configurable Data

Session ID - A session ID or "All Sessions" option may be selected. By default the First Session is selected.

Session Mode - Specifies the Session Mode for a selected session ID. By default Session Mode is enabled.

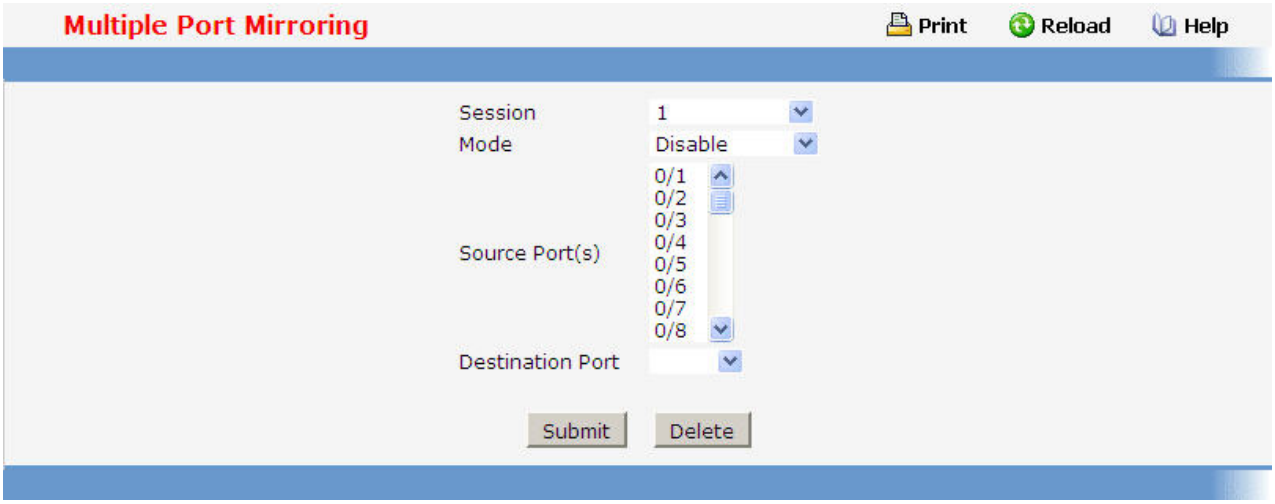
Source Port(s) - Specifies the configured port(s) as mirrored port(s). Traffic of the configured port(s) is sent to the probe port.

Destination Port - Acts as a probe port and will recieve all the traffic from configured mirrored port(s). Default value is blank.

Command Buttons

Submit - Send the updated screen to the switch and cause the changes to take effect on the switch.

Delete - Remove the selected session configuration.



8.2.1.7 **Defining SNMP**

Configuring SNMP Community Configuration Page

By default, two SNMP Communities exist:

private, with 'Read/Write' privileges and status set to enable

public, with 'Read Only' privileges and status set to enable

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These are well-known communities, you can use this menu to change the defaults or to add other communities. Only the communities that you define using this menu will have access to the switch using the SNMPv1 and SNMPv2c protocols. Only those communities with read-write level access will have access to this menu via SNMP.

You should use this menu when you are using the SNMPv1 and SNMPv2c protocol: if you want to use SNMP v3 you should use the User Accounts menu.

Configurable Data

SNMP Community Name - You can use this screen to reconfigure an existing community, or to create a new one. Use this pulldown menu to select one of the existing community names, or select 'Create' to add a new one. A valid entry is a case-sensitive string of up to 16 characters. The default community names are *public* and *private*.

Client IP Address - Taken together, the Client IP Address and Client IP Mask denote a range of IP addresses from which SNMP clients may use that community to access this device. If either (IP Address or IP Mask) value is 0.0.0.0, access is allowed from any IP address. Otherwise, every client's IP address is ANDed with the mask, as is the Client IP Address, and, if the values are equal, access is allowed. For example, if the Client IP Address and Client IP Mask parameters are 192.168.1.0/255.255.255.0, then any client whose IP address is 192.168.1.0 through 192.168.1.255 (inclusive) will be allowed access. To allow access from only one station, use a Client IP Mask value of 255.255.255.255, and use that machine's IP address for Client IP Address.

Client IP Mask - Taken together, the Client IP Address and Client IP Mask denote a range of IP addresses from which SNMP clients may use that community to access this device. If either (IP Address or IP Mask) value is 0.0.0.0, access is allowed from any IP address. Otherwise, every client's IP address is ANDed with the mask, as is the Client IP Address, and, if the values are equal, access is allowed. For example, if the Client IP Address and Client IP Mask parameters are 192.168.1.0/255.255.255.0, then any client whose IP address is 192.168.1.0 through 192.168.1.255 (inclusive) will be allowed access. To allow access from only one station, use a Client IP Mask value of 255.255.255.255, and use that machine's IP address for Client IP Address.

Access Mode - Specify the access level for this community by selecting Read/Write or Read Only from the pull down menu.

Status - Specify the status of this community by selecting Enable or Disable from the pull down menu. If you select enable, the Community Name must be unique among all valid Community Names or the set request will be rejected. If you select disable, the Community Name will become invalid.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected Community Name. If you want the switch to retain the new values across a power cycle, you must perform a save.

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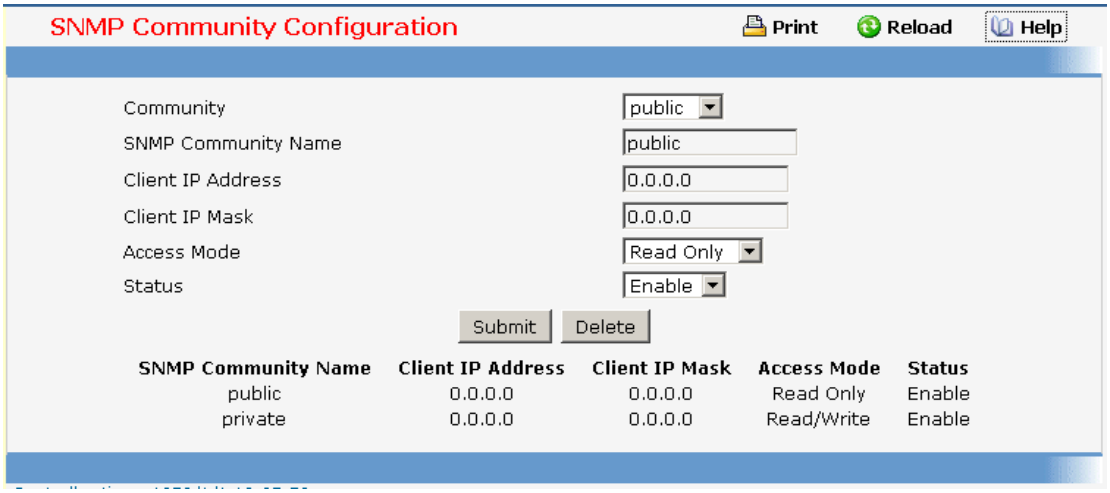

Configuring SNMP Trap Receiver Configuration Page

This menu will display an entry for every active Trap Receiver.

Configurable Data

SNMP Community Name - Enter the community string for the SNMP trap packet to be sent to the trap manager. This may be up to 16 characters and is case sensitive.

SNMP Version - Select the trap version to be used by the receiver from the pull down menu:

SNMP v1 - Uses SNMP v1 to send traps to the receiver.

SNMP v2 - Uses SNMP v2 to send traps to the receiver.

IP Address - Enter the IP address to receive SNMP traps from this device. Enter 4 numbers between 0 and 255 separated by periods.

Status - Select the receiver's status from the pulldown menu:

Enable - send traps to the receiver.

Disable - do not send traps to the receiver.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Delete the currently selected Community Name. If you want the switch to retain the new values across a power cycle, you must perform a save.

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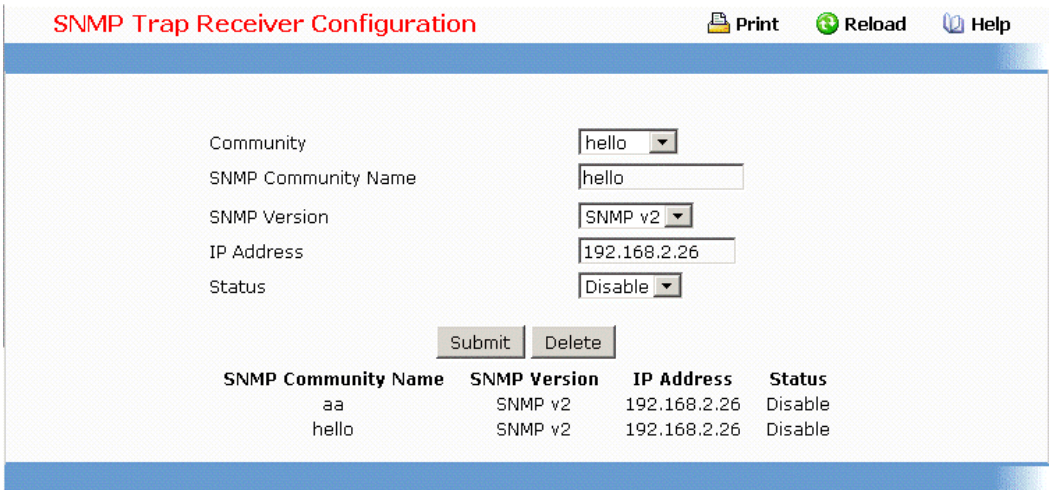

Viewing SNMP supported MIBs Page

This is a list of all the MIBs supported by the switch.

Non-configurable Data

Name - The RFC number if applicable and the name of the MIB.

Description - The RFC title or MIB description.

Command Buttons

Refresh - Update the data.

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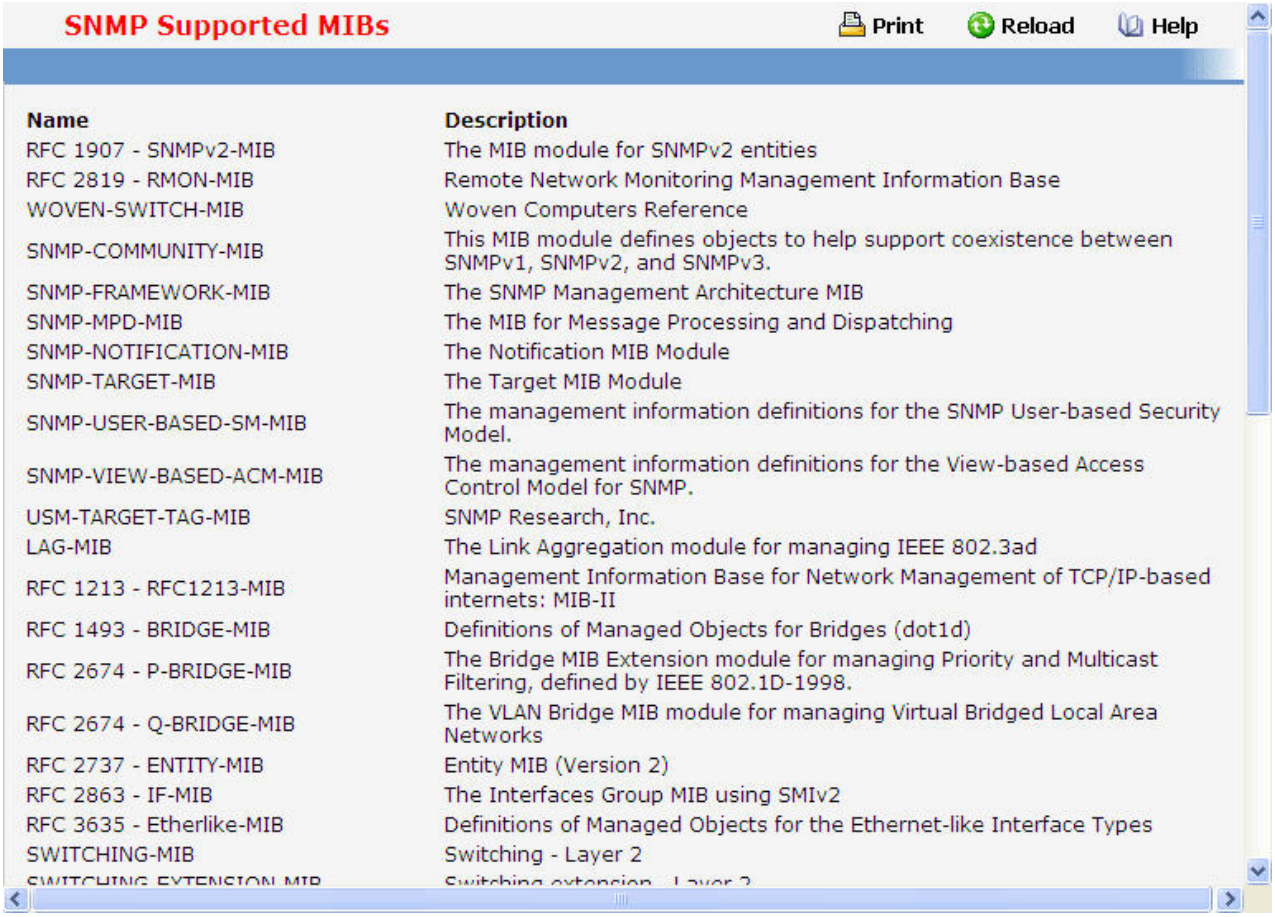
SNMP Supported MIBs
Print
Reload
Help
Name
Description
RFC 1907 - SNMPv2-MIB
The MIB module for SNMPv2 entities
RFC 2819 - RMON-MIB
Remote Network Monitoring Management Information Base
WOVEN-SWITCH-MIB
Woven Computers Reference
SNMP-COMMUNITY-MIB
This MIB module defines objects to help support coexistence between SNMPv1, SNMPv2, and SNMPv3.
SNMP-FRAMEWORK-MIB
The SNMP Management Architecture MIB
SNMP-MPD-MIB
The MIB for Message Processing and Dispatching
SNMP-NOTIFICATION-MIB
The Notification MIB Module
SNMP-TARGET-MIB
The Target MIB Module
SNMP-USER-BASED-SM-MIB
The management information definitions for the SNMP User-based Security Model.
SNMP-VIEW-BASED-ACM-MIB
The management information definitions for the View-based Access Control Model for SNMP.
USM-TARGET-TAG-MIB
SNMP Research, Inc.
LAG-MIB
The Link Aggregation module for managing IEEE 802.3ad
RFC 1213 - RFC1213-MIB
Management Information Base for Network Management of TCP/IP-based internets: MIB-II
RFC 1493 - BRIDGE-MIB
Definitions of Managed Objects for Bridges (dot1d)
RFC 2674 - P-BRIDGE-MIB
The Bridge MIB Extension module for managing Priority and Multicast Filtering, defined by IEEE 802.1D-1998.
RFC 2674 - Q-BRIDGE-MIB
The VLAN Bridge MIB module for managing Virtual Bridged Local Area Networks
RFC 2737 - ENTITY-MIB
Entity MIB (Version 2)
RFC 2863 - IF-MIB
The Interfaces Group MIB using SMIv2
RFC 3635 - Etherlike-MIB
Definitions of Managed Objects for the Ethernet-like Interface Types
SWITCHING-MIB
Switching - Layer 2

8.2.1.8 **Viewing Statistics**

Viewing the whole Switch Detailed Statistics Page

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with the Processor of this switch.

Octets Received - The total number of octets of data received by the processor (excluding framing bits but including FCS octets).

Packets Received Without Errors - The total number of packets (including broadcast packets and multicast packets) received by the processor.

Unicast Packets Received - The number of subnetwork-unicast packets delivered to a higher-layer protocol.

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Multicast Packets Received - The total number of packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.

Broadcast Packets Received - The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Receive Packets Discarded - The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Octets Transmitted - The total number of octets transmitted out of the interface, including framing characters.

Packets Transmitted Without Errors - The total number of packets transmitted out of the interface.

Unicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

Multicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.

Broadcast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.

Transmit Packets Discarded - The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. A possible reason for discarding a packet could be to free up buffer space.

Most Address Entries Ever Used - The highest number of Forwarding Database Address Table entries that have been learned by this switch since the most recent reboot.

Address Entries in Use - The number of Learned and static entries in the Forwarding Database Address Table for this switch.

Maximum VLAN Entries - The maximum number of Virtual LANs (VLANs) allowed on this switch.

Most VLAN Entries Ever Used - The largest number of VLANs that have been active on this switch since the last reboot.

Static VLAN Entries - The number of presently active VLAN entries on this switch that have been created statically.

Dynamic VLAN Entries - The number of presently active VLAN entries on this switch that have been created by GVRP registration.

VLAN Deletes - The number of VLANs on this switch that have been created and then deleted since the last reboot.

Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds, since the statistics for this switch were last cleared.

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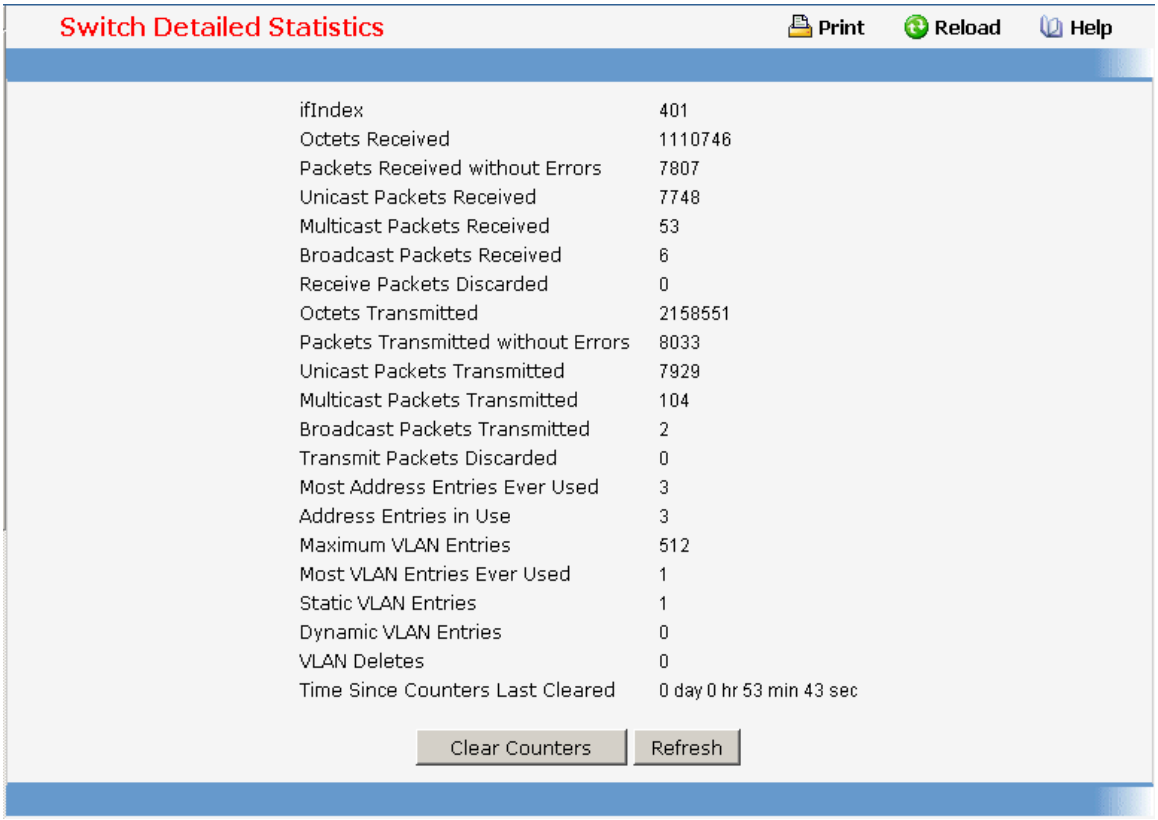
Command Buttons

Clear Counters - Clear all the counters, resetting all switch summary and detailed statistics to default values. The discarded packets count cannot be cleared.

Refresh - Refresh the data on the screen with the present state of the data in the switch.



Viewing the whole Switch Summary Statistics Page

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with the Processor of this switch.

Packets Received Without Errors - The total number of packets (including broadcast packets and multicast packets) received by the processor.

Broadcast Packets Received - The total number of packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Packets Received with Errors - The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Packets Transmitted Without Errors - The total number of packets transmitted out of the interface.

Broadcast Packets Transmitted - The total number of packets that higher-level protocols requested to be transmitted to the Broadcast address, including those that were discarded or not sent.

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Transmit Packet Errors - The number of outbound packets that could not be transmitted because of errors.

Address Entries Currently in Use - The total number of Forwarding Database Address Table entries now active on the switch, including learned and static entries.

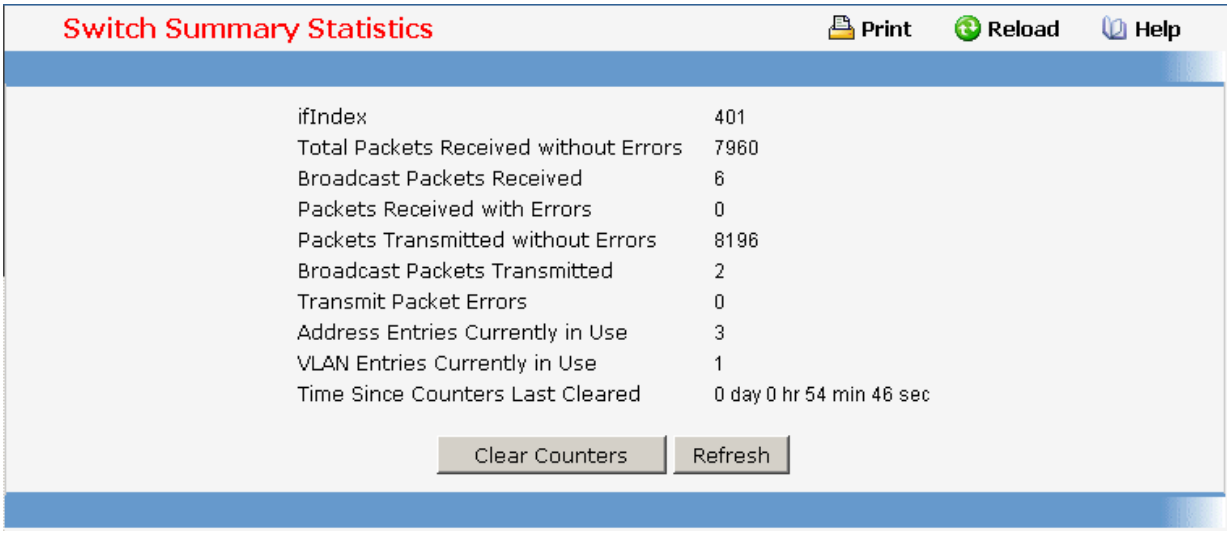
VLAN Entries Currently in Use - The number of VLAN entries presently occupying the VLAN table.

Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds since the statistics for this switch were last cleared.

Command Buttons

Clear Counters - Clear all the counters, resetting all summary and switch detailed statistics to defaults. The discarded packets count cannot be cleared.

Refresh - Refresh the data on the screen with the present state of the data in the switch.


Switch Summary Statistics
Print
Reload
Help
ifIndex 401
Total Packets Received without Errors 7960
Broadcast Packets Received 6
Packets Received with Errors 0
Packets Transmitted without Errors 8196
Broadcast Packets Transmitted 2
Transmit Packet Errors 0
Address Entries Currently in Use 3
VLAN Entries Currently in Use 1
Time Since Counters Last Cleared 0 day 0 hr 54 min 46 sec
Clear Counters
Refresh

Viewing Each Port Detailed Statistics Page

Selection Criteria

Slot/Port - Selects the interface for which data is to be displayed or configured.

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with this port on an adapter.

Packets RX and TX 64 Octets - The total number of packets (including bad packets) received or transmitted that were 64 octets in length (excluding framing bits but including FCS octets).

Packets RX and TX 65-127 Octets - The total number of packets (including bad packets) received or transmitted that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

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Packets RX and TX 128-255 Octets - The total number of packets (including bad packets) received or transmitted that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 256-511 Octets - The total number of packets (including bad packets) received or transmitted that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 512-1023 Octets - The total number of packets (including bad packets) received or transmitted that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 1024-1518 Octets - The total number of packets (including bad packets) received or transmitted that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 1519-1522 Octets - The total number of packets (including bad packets) received or transmitted that were between 1519 and 1522 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 1523-2047 Octets - The total number of packets (including bad packets) received or transmitted that were between 1523 and 2047 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 2048-4095 Octets - The total number of packets (including bad packets) received or transmitted that were between 2048 and 4095 octets in length inclusive (excluding framing bits but including FCS octets).

Packets RX and TX 4096-9216 Octets - The total number of packets (including bad packets) received or transmitted that were between 4096 and 9216 octets in length inclusive (excluding framing bits but including FCS octets).

Octets Received - The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of ethernet utilization. If greater precision is desired, the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval.

Packets Received 64 Octets - The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

Packets Received 65-127 Octets - The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 128-255 Octets - The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 256-511 Octets - The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received 512-1023 Octets - The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

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Packets Received 1024-1518 Octets - The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Received > 1522 Octets - The total number of packets received that were longer than 1522 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.

Total Packets Received Without Errors - The total number of packets received that were without errors.

Unicast Packets Received - The number of subnetwork-unicast packets delivered to a higher-layer protocol.

Multicast Packets Received - The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.

Broadcast Packets Received - The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Total Packets Received with MAC Errors - The total number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Jabbers Received - The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Note that this definition of jabber is different than the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition where any packet exceeds 20 ms. The allowed range to detect jabber is between 20 ms and 150 ms.

Fragments Received - The total number of packets received that were less than 64 octets in length with ERROR CRC(excluding framing bits but including FCS octets).

Undersize Received - The total number of packets received that were less than 64 octets in length with GOOD CRC(excluding framing bits but including FCS octets).

Alignment Errors - The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad Frame Check Sequence (FCS) with a non-integral number of octets.

Rx FCS Errors - The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad Frame Check Sequence (FCS) with an integral number of octets

Overruns - The total number of frames discarded as this port was overloaded with incoming packets, and could not keep up with the inflow.

Total Packets Transmitted (Octets) - The total number of octets of data (including those in bad packets) transmitted on the network (excluding framing bits but including FCS octets). This object can be used as a reasonable estimate of ethernet utilization. If greater precision is desired, the etherStatsPkts and etherStatsOctets objects should be sampled before and after a common interval.

Packets Transmitted 64 Octets - The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

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Packets Transmitted 65-127 Octets - The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 128-255 Octets - The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 256-511 Octets - The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 512-1023 Octets - The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 1024-1518 Octets - The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 1523-2047 Octets - The total number of packets (including bad packets) received that were between 1523 and 2047 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 2048-4095 Octets - The total number of packets (including bad packets) received that were between 2048 and 4095 octets in length inclusive (excluding framing bits but including FCS octets).

Packets Transmitted 4096-9216 Octets - The total number of packets (including bad packets) received that were between 4096 and 9216 octets in length inclusive (excluding framing bits but including FCS octets).

Maximum Frame Size - The maximum ethernet frame size the interface supports or is configured, including ethernet header, CRC, and payload. (1518 to 9216). The default maximum frame size is 1518 .

Total Packets Transmitted Successfully - The number of frames that have been transmitted by this port to its segment.

Unicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

Multicast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to a Multicast address, including those that were discarded or not sent.

Broadcast Packets Transmitted - The total number of packets that higher-level protocols requested be transmitted to the Broadcast address, including those that were discarded or not sent.

Total Transmit Errors - The sum of Single, Multiple, and Excessive Collisions.

Tx FCS Errors - The total number of packets transmitted that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had a bad Frame Check Sequence (FCS) with an integral number of octets

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Tx Oversized - The total nummber of frames that exceeded the max permitted frame size. This counter has a max increment rate of 815 counts per sec at 10 Mb/s.

Underrun Errors - The total number of frames discarded because the transmit FIFO buffer became empty during frame transmission.

Total Transmit Packets Discarded - The sum of single collision frames discarded, multiple collision frames discarded, and excessive frames discarded.

Single Collision Frames - A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision.

Multiple Collision Frames - A count of the number of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.

Excessive Collision Frames - A count of frames for which transmission on a particular interface fails due to excessive collisions.

STP BPDUs Received - Number of STP BPDUs received at the selected port.

STP BPDUs Transmitted - Number of STP BPDUs transmitted from the selected port.

RSTP BPDUs Received - Number of RSTP BPDUs received at the selected port.

RSTP BPDUs Transmitted - Number of RSTP BPDUs transmitted from the selected port.

MSTP BPDUs Received - Number of MSTP BPDUs received at the selected port.

MSTP BPDUs Transmitted - Number of MSTP BPDUs transmitted from the selected port.

GVRP PDUs Received - The count of GVRP PDUs received in the GARP layer.

GVRP PDUs Transmitted - The count of GVRP PDUs transmitted from the GARP layer.

GVRP Failed Registrations - The number of times attempted GVRP registrations could not be completed.

GMRP PDUs Received - The count of GMRP PDUs received from the GARP layer.

GMRP PDUs Transmitted - The count of GMRP PDUs transmitted from the GARP layer.

GMRP Failed Registrations - The number of times attempted GMRP registrations could not be completed.

Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

Command Buttons

Clear Counters - Clear all the counters, resetting all statistics for this port to default values.

Clear All Counters - Clear all the counters for all ports, resetting all statistics for all ports to default values.

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Refresh - Refresh the data on the screen with the present state of the data in the switch.

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Port Detailed Statistics
Print
Reload
Help
Slot/Port 0/1
ifIndex 1
Packets RX and TX 64 Octets 2745317111
Packets RX and TX 65-127 Octets 2556887846
Packets RX and TX 128-255 Octets 897867
Packets RX and TX 256-511 Octets 10937886
Packets RX and TX 512-1023 Octets 26814659
Packets RX and TX 1024-1518 Octets 1289889955
Packets RX and TX 1519-2047 Octets 43
Packets RX and TX 2048-4095 Octets 392638
Packets RX and TX 4096-9216 Octets 14099900
Octets Received 21902006533363
Packets Received 64 Octets 2716192261
Packets Received 65-127 Octets 119988726
Packets Received 128-255 Octets 242329
Packets Received 256-511 Octets 4027476
Packets Received 512-1023 Octets 16720483
Packets Received 1024-1518 Octets 736798475
Packets Received > 1522 Octets 14492579
Total Packets Received without Errors 3608462329
Unicast Packets Received 3593967535
Multicast Packets Received 281
Broadcast Packets Received 1934
Total Packets Received with MAC Errors 0
Jabbers Received 0
Undersize Received 0
Fragments Received 0
Alignment Errors 0
Rx FCS Errors 0
Overruns 0
Total Packets Transmitted (Octets) 15122429530102
Packets Transmitted 64 Octets 29124850
Packets Transmitted 65-127 Octets 2436899120
Packets Transmitted 128-255 Octets 655538
Packets Transmitted 256-511 Octets 6910410
Packets Transmitted 512-1023 Octets 10094176
Packets Transmitted 1024-1518 Octets 553091480
Total Packets Transmitted Successfully 3045864354
Unicast Packets Transmitted 3036690273
Multicast Packets Transmitted 84269
Broadcast Packets Transmitted 1032
Total Transmit Errors 0
Tx FCS Errors 0
Underrun Errors 0
Total Transmit Packets Discarded 1451104
Single Collision Frames 0
Multiple Collision Frames 0
Excessive Collision Frames 0
GVRP PDUs Received 0
GVRP PDUs Transmitted 0
GVRP Failed Registrations 0
GMRP PDUs Received 0
GMRP PDUs Transmitted 0
GMRP Failed Registrations 0
STP BPDUs Received 0
STP BPDUs Transmitted 0
RSTP BPDUs Received 0
RSTP BPDUs Transmitted 0
MSTP BPDUs Received 0
MSTP BPDUs Transmitted 0
Time Since Counters Last Cleared 11 day 19 hr 2 min 42 se
Clear Counters
Clear All Counters
Refresh

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Viewing Each Port Summary Statistics Page

Selection Criteria

Slot/Port - Selects the interface for which data is to be displayed or configured.

Non-Configurable Data

ifIndex - This object indicates the ifIndex of the interface table entry associated with this port on an adapter.

Total Packets Received without Errors - The total number of packets received that were without errors.

Packets Received with Errors - The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

Broadcast Packets Received - The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.

Packets Transmitted without Errors - The number of frames that have been transmitted by this port to its segment.

Transmit Packet Errors - The number of outbound packets that could not be transmitted because of errors.

Collision Frames - The best estimate of the total number of collisions on this Ethernet segment.

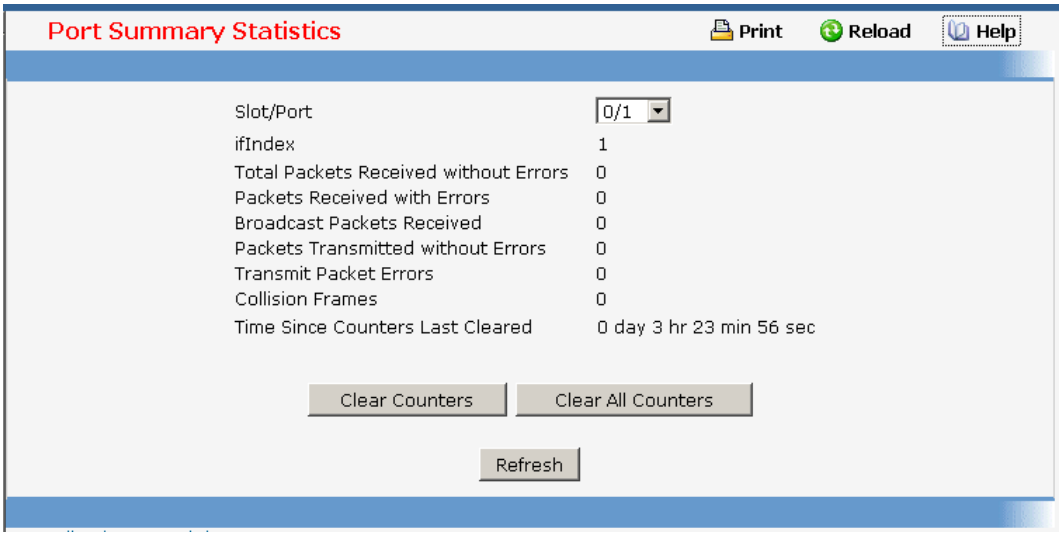
Time Since Counters Last Cleared - The elapsed time, in days, hours, minutes, and seconds since the statistics for this port were last cleared.

Command Buttons

Clear Counters - Clears all the counters, resetting all statistics for this port to default values.

Clear All Counters - Clears all the counters for all ports, resetting all statistics for all ports to default values.

Refresh – Refreshes the data on the screen with the present state of the data in the switch.



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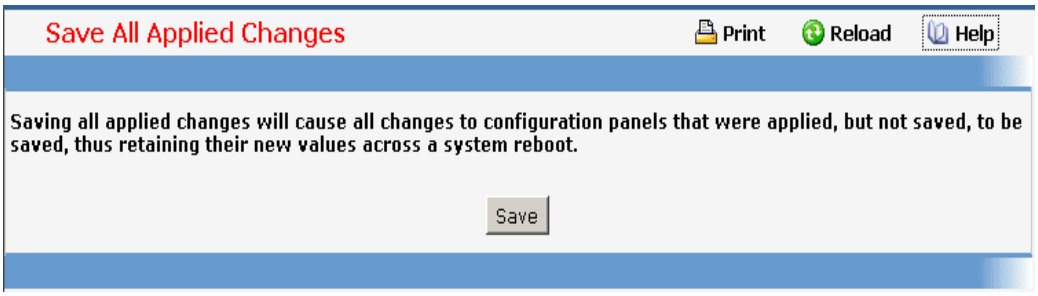
8.2.1.9 **Managing System Utilities**

Saving All Configuration Changed Page

Command Buttons

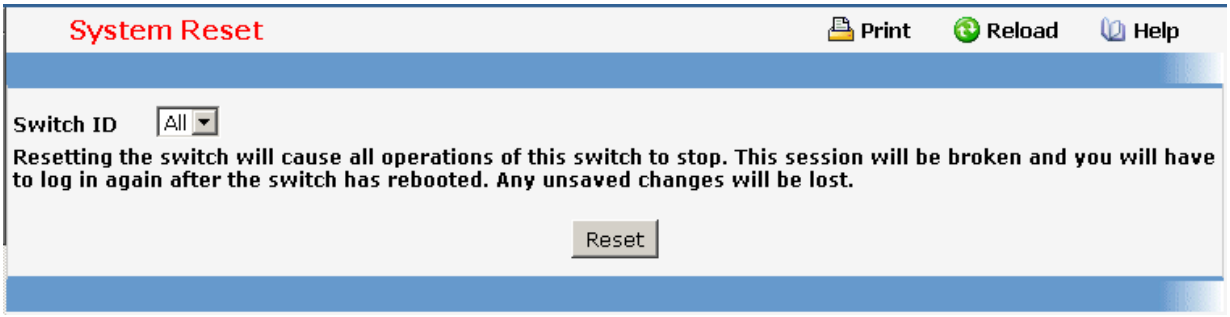
Save - Click this button to have configuration changes you have made saved across a system reboot. All changes submitted since the previous save or system reboot will be retained by the switch.


Save All Applied Changes
Print
Reload
Help
Saving all applied changes will cause all changes to configuration panels that were applied, but not saved, to be saved, thus retaining their new values across a system reboot.
Save

Resetting the Switch Page

Command Buttons

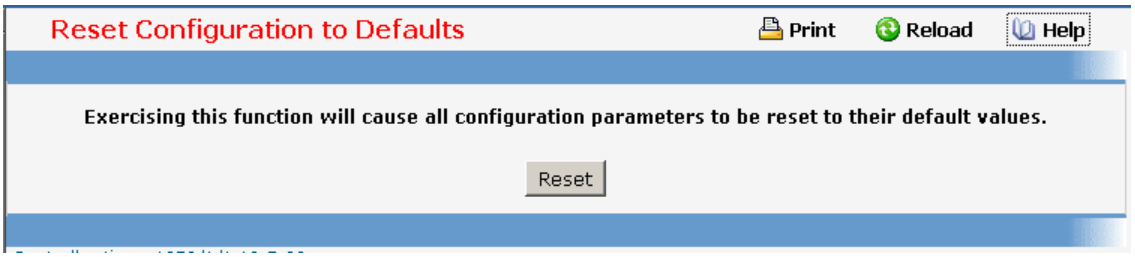
Reset - Select this button to reboot the switch. Any configuration changes you have made since the last time you issued a save will be lost. You will be shown a confirmation screen after you select the button.


System Reset
Print
Reload
Help
Switch ID
All
Resetting the switch will cause all operations of this switch to stop. This session will be broken and you will have to log in again after the switch has rebooted. Any unsaved changes will be lost.
Reset

Restoring All Configuration to Default Values Page

Command Buttons

Reset - Clicking the Reset button will reset all of the system login passwords to their default values. If you want the switch to retain the new values across a power cycle, you must perform a save.



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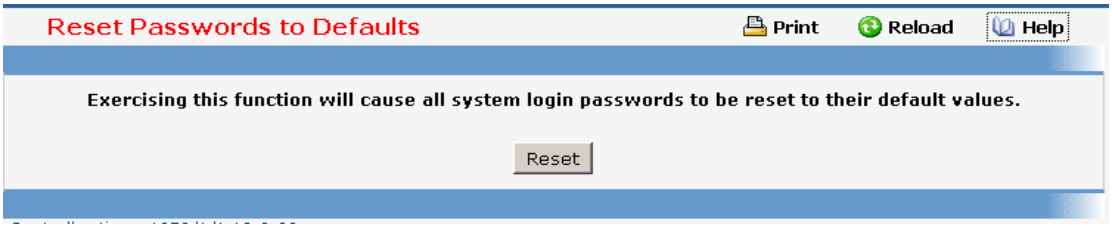
Resetting the Passwords to Default Values Page

Command Buttons

Reset - Select this button to have all passwords reset to their factory default values.


Reset Passwords to Defaults
Print
Reload
Help
Exercising this function will cause all system login passwords to be reset to their default values.
Reset

Downloading Specific Files to Switch Flash Page

Use this menu to download a file to the switch.

Configurable Data

File Type - Specify what type of file you want to download:

Script - specify configuration script when you want to update the switch's script file.

CLI Banner - Specify the banner that you want to display before user login to the switch.

Code – Specify code when you want to upgrade the operational flash.

Configuration - Specify configuration when you want to update the switch's configuration. If the file has errors the update will be stopped.

SSH-1 RSA Key File - SSH-1 Rivest-Shamir-Adleman (RSA) Key File

SSH-2 RSA Key PEM File - SSH-2 Rivest-Shamir-Adleman (RSA) Key File (PEM Encoded)

SSH-2 DSA Key PEM File - SSH-2 Digital Signature Algorithm (DSA) Key File (PEM Encoded)

SSL Trusted Root Certificate PEM File - SSL Trusted Root Certificate File (PEM Encoded)

SSL Server Certificate PEM File - SSL Server Certificate File (PEM Encoded)

SSL DH Weak Encryption Parameter PEM File - SSL Diffie-Hellman Weak Encryption Parameter File (PEM Encoded)

SSL DH Strong Encryption Parameter PEM File - SSL Diffie-Hellman Strong Encryption Parameter File (PEM Encoded)

The factory default is code.
Note that to download SSH key files SSH must be administratively disabled and there can be no active SSH sessions.

TFTP Server IP Address - Enter the IP address of the TFTP server. The factory default is 0.0.0.0.

TFTP File Path (Target) - Enter the path on the TFTP server where the selected file is located. You may enter up to 32 characters. The factory default is blank.

TFTP File Name (Source) - Enter the name on the TFTP server of the file you want to download. You may enter up to 32 characters. The factory default is blank.

TFTP File Name (Target) - Enter the name on the switch of the file you want to save. You may enter up to 32 characters. The factory default is blank.

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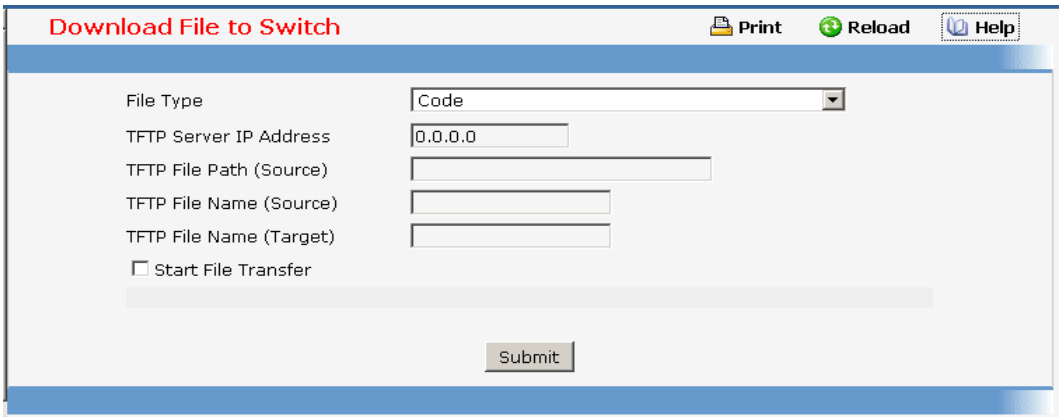
Start File Transfer - To initiate the download you need to check this box and then select the submit button.

Non-Configurable Data

The last row of the table is used to display information about the progress of the file transfer. The screen will refresh automatically until the file transfer completes.

Command Buttons

Submit - Send the updated screen to the switch and perform the file download.



Uploading Specific Files from Switch Flash Page

Use this menu to upload a code, configuration, or log file from the switch.

Configurable Data

File Type - Specify the type of file you want to upload. The available options are Script, Code, CLI Banner, Configuration, Error Log, Buffered Log, and Trap Log. The factory default is Error Log.

TFTP Server IP Address - Enter the IP address of the TFTP server. The factory default is 0.0.0.0

TFTP File Path (Target) - Enter the path on the TFTP server where you want to put the file being uploaded. You may enter up to 32 characters. The factory default is blank.

TFTP File Name (Target) - Enter the name you want to give the file being uploaded. You may enter up to 32 characters. The factory default is blank.

TFTP File Name (Source) - Specify the file which you want to upload from the switch.

Start File Transfer - To initiate the upload you need to check this box and then select the submit button.

Non-Configurable Data

The last row of the table is used to display information about the progress of the file transfer. The screen will refresh automatically until the file transfer completes.

Command Buttons

Submit - Send the updated screen to the switch and perform the file upload.

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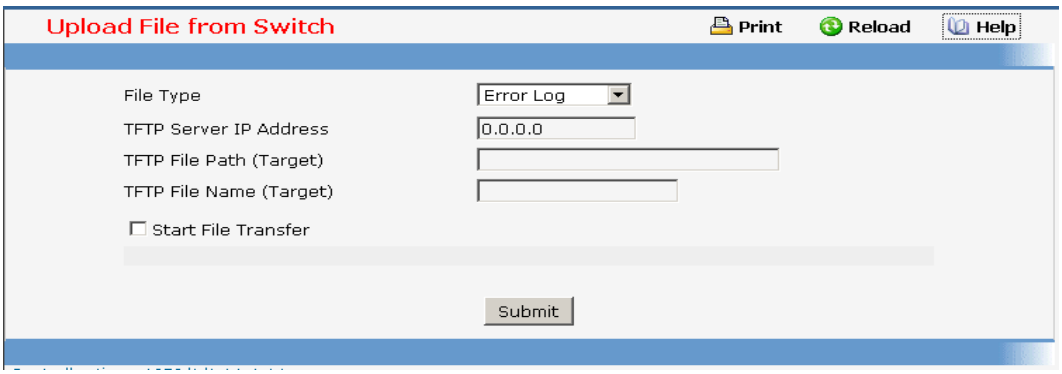


Defining Configuration and Runtime Startup File Page

Specify the file used to start up the system.

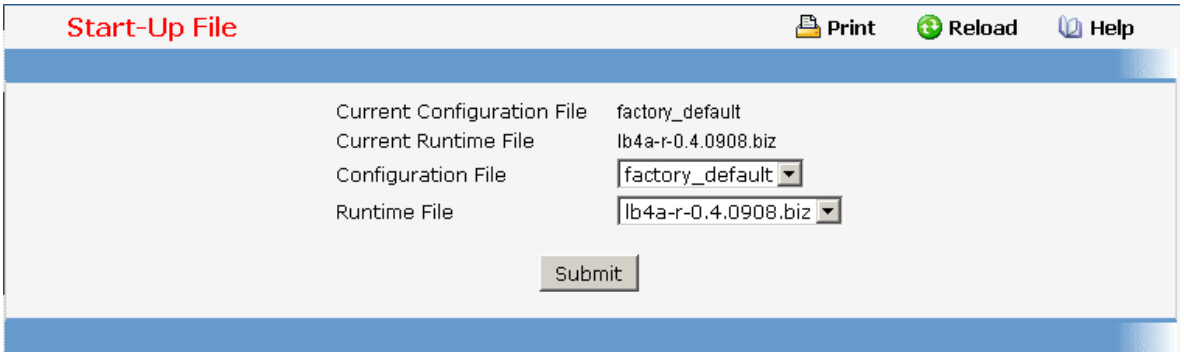
Configurable Data

Configuration File - Configuration files.

Runtime File - Run-time operation codes.

Command Buttons

Submit - Send the updated screen to the switch and specify the file start-up.



Removing Specific File Page

Delete files in flash. If the file type is used for system startup, then this file cannot be deleted.

Configurable Data

Configuration File - Configuration files.

Runtime File - Run-time operation codes.

Script File - Configuration script files.

Command Buttons

Remove File - Send the updated screen to the switch and perform the file remove.

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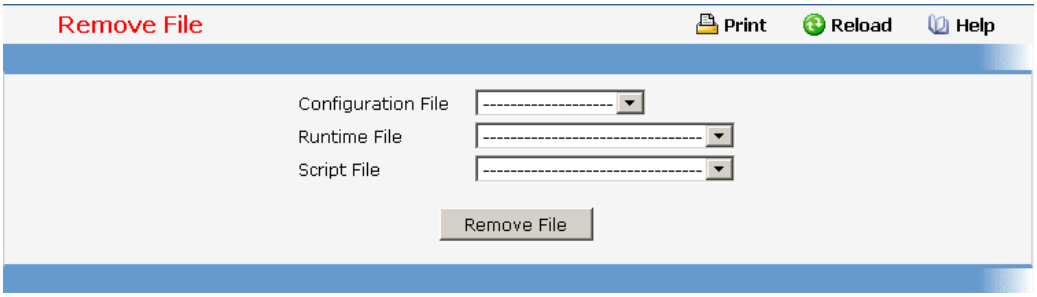


Copying Running Configuration to Flash Page

Use this menu to copy a start-up configuration file from the running configuration file on switch.

Configurable Data

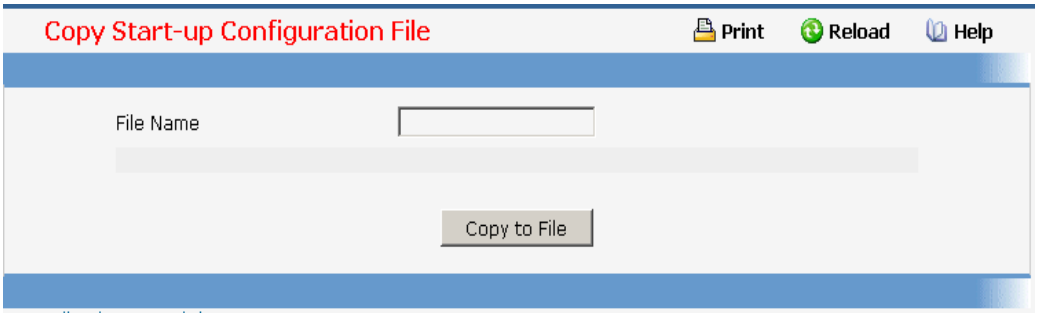
File Name - Enter the name you want to give the file being copied. You may enter up to 32 characters. The factory default is blank.

Non-Configurable Data

The last row of the table is used to display information about the progress of the file copy. The screen will refresh automatically until the file copy completes.

Command Buttons

Copy to File - Send the updated screen to the switch perform the file copy.



Defining Ping Function Page

Use this screen to tell the switch to send a Ping request to a specified IP address. You can use this to check whether the switch can communicate with a particular IP station. Once you click the Submit button, the switch will send three pings and the results will be displayed below the configurable data. If a reply to the ping is not received, you will see **No Reply Received from IP xxx.xxx.xxx.xxx**, otherwise you will see **Reply received from IP xxx.xxx.xxx.xxx : (send count = 5, receive count = n).**

Configurable Data

IP Address - Enter the IP address of the station you want the switch to ping. The initial value is blank. The IP Address you enter is not retained across a power cycle.

Command Buttons

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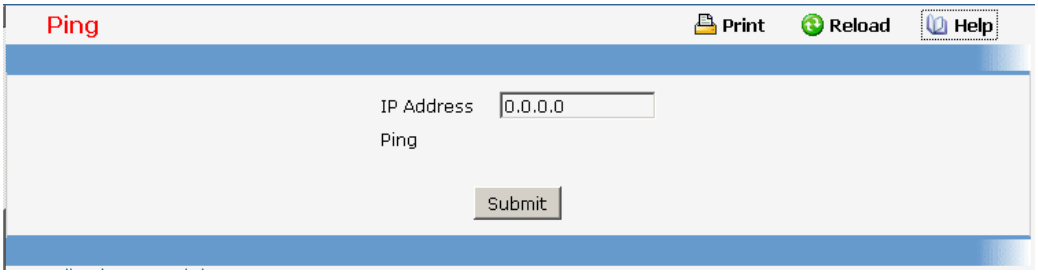
Submit - This will initiate the ping.



Managing CDP Function

Defining CDP Configuration Page

Use this menu to configure the parameters for CDP, which is used to discover a CISCO device on the LAN.

Configurable Data

Admin Mode - CDP administration mode which are Enable and Disable.

Hold Time - the legal time period of a received CDP packet.

Transmit Interval - the CDP packet sending interval.

Port Authen. State - the CDP administration mode for all ports which are Enable and Disable.

Command Buttons

Submit - Send the updated screen to the switch. Changes take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

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Viewing Neighbors Information Page

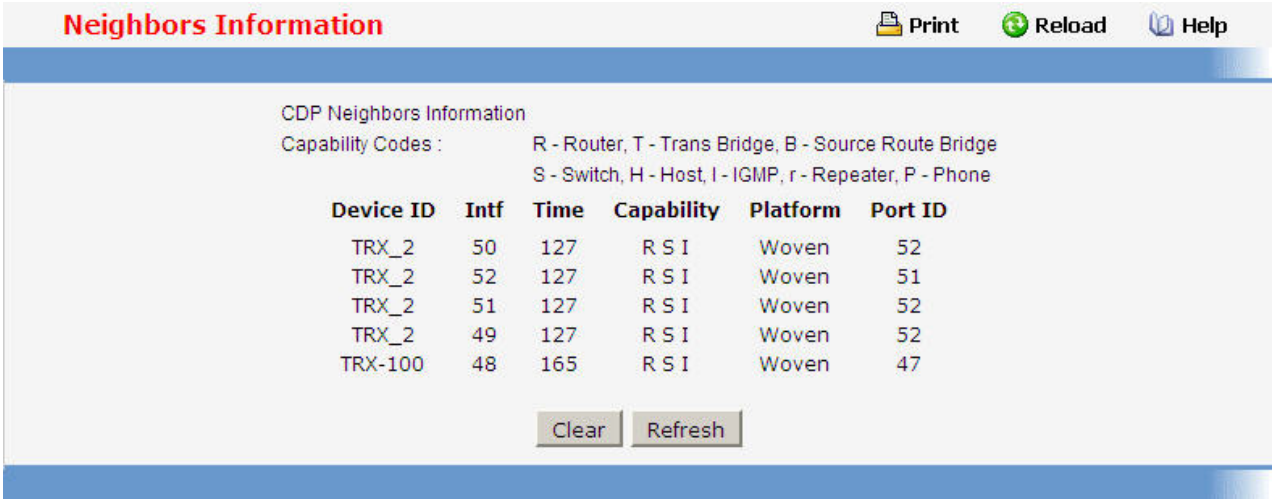
Non-Configurable Data

Use this menu to display CDP neighbors device information in the LAN.

Command Buttons

Clear - Clear all the counters, resetting all switch summary and detailed statistics to default values. The discarded packets count cannot be cleared.

Refresh - Refresh the data on the screen with the present state of the data in the switch.


Neighbors Information
Print
Reload
Help
CDP Neighbors Information
Capability Codes :
R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID Intf Time Capability Platform Port ID
TRX_2 50 127 R S I Woven 52
TRX_2 52 127 R S I Woven 51
TRX_2 51 127 R S I Woven 52
TRX_2 49 127 R S I Woven 52
TRX-100 48 165 R S I Woven 47
Clear
Refresh

Viewing Traffic Statistics Page

Use this menu to display CDP traffic statistics.

Non-Configurable Data

Incoming Packet Number - Received legal CDP packets number from neighbors.

Outgoing Packet Number - Transmitted CDP packets number from this device.

Error Packet Number - Received illegal CDP packets number from neighbors.

Command Buttons

Clear Counters - Clear all the counters, resetting all switch summary and detailed statistics to default values. The discarded packets count cannot be cleared.

Refresh - Refresh the data on the screen with the present state of the data in the switch.

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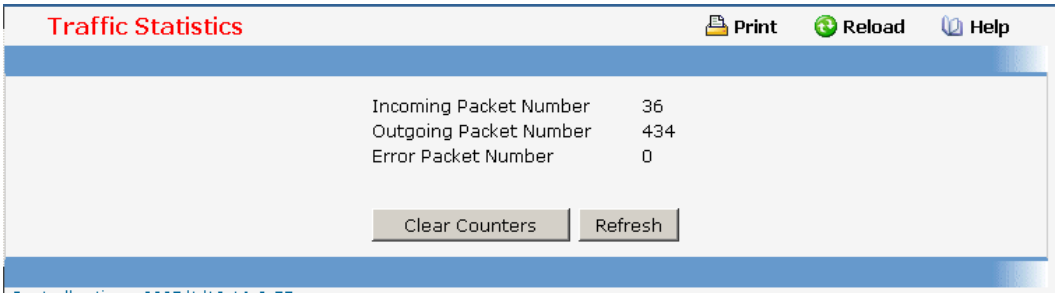

8.2.1.10 **Defining Trap Manager**

Configuring Trap Flags Page

Use this menu to specify which traps you want to enable. When the condition identified by an active trap is encountered by the switch a trap message will be sent to any enabled SNMP Trap Receivers, and a message will be written to the trap log.

Configurable Data

Authentication - Enable or disable activation of authentication failure traps by selecting the corresponding line on the pull down entry field. The factory default is enabled.

Link Up/Down - Enable or disable activation of link status traps by selecting the corresponding line on the pull down entry field. The factory default is enabled.

Multiple Users - Enable or disable activation of multiple user traps by selecting the corresponding line on the pull down entry field. The factory default is enabled. This trap is triggered when the same user ID is logged into the switch more than once at the same time (either via telnet or the serial port).

Spanning Tree - Enable or disable activation of spanning tree traps by selecting the corresponding line on the pull down entry field. The factory default is enabled.

OSPF Traps - Enabled or disable activation of OSPF traps by selecting the corresponding line on the pulldown entry field. The factory default is disabled. This field can be configured only if the OSPF admin mode is enabled.

DVMRP Traps - Enabled or disable activation of DVMRP traps by selecting the corresponding line on the pulldown entry field. The factory default is disabled.

PIM Traps - Enabled or disable activation of PIM traps by selecting the corresponding line on the pulldown entry field. The factory default is disabled.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch. These changes will not be retained across a power cycle unless a save is performed.

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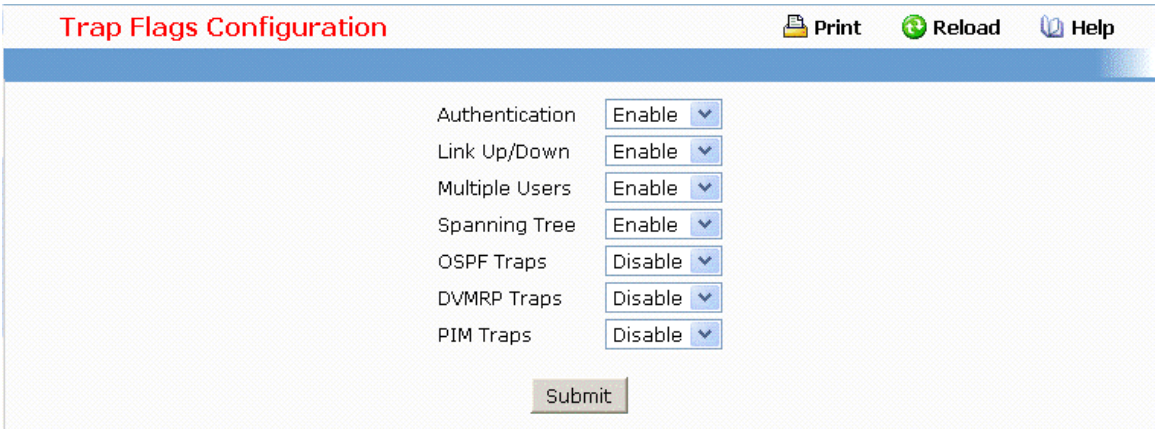

Viewing Trap Log Page

This screen lists the entries in the trap log. The information can be retrieved as a file by using System Utilities, Upload File from Switch.

Non-Configurable Data

Number of Traps since last reset - The number of traps that have occurred since the switch were last reset.

Trap Log Capacity - The maximum number of traps stored in the log. If the number of traps exceeds the capacity, the entries will overwrite the oldest entries.

Log - The sequence number of this trap.

System Up Time - The time at which this trap occurred, expressed in days, hours, minutes and seconds since the last reboot of the switch.

Trap - Information identifying the trap.

Command Buttons

Clear Log - Clear all entries in the log. Subsequent displays of the log will only show new log entries.

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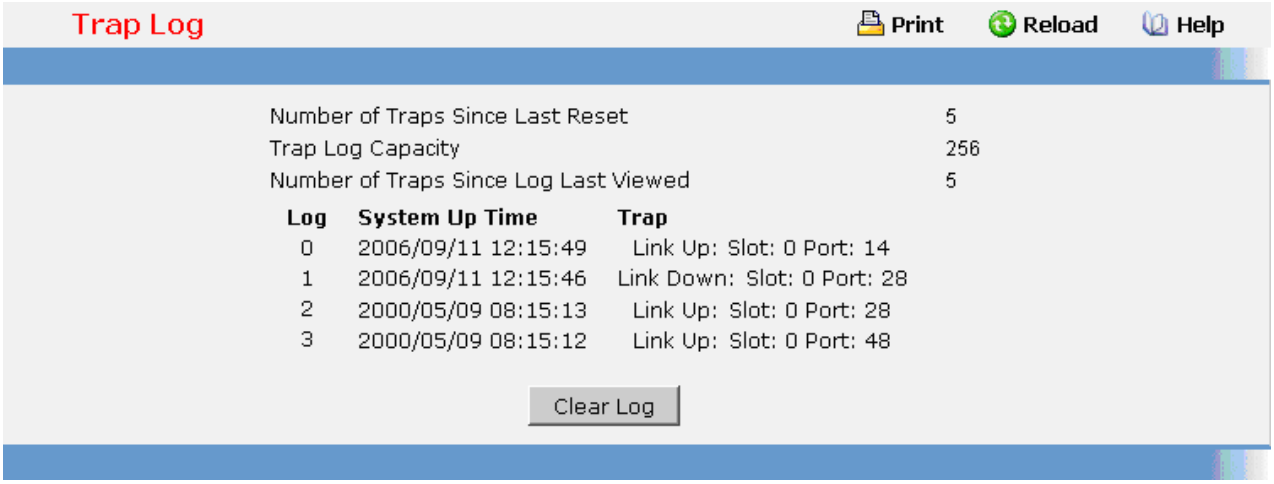
Trap Log
Print
Reload
Help
Number of Traps Since Last Reset 5
Trap Log Capacity 256
Number of Traps Since Log Last Viewed 5
Log System Up Time Trap
0 2006/09/11 12:15:49 Link Up: Slot: 0 Port: 14
1 2006/09/11 12:15:46 Link Down: Slot: 0 Port: 28
2 2000/05/09 08:15:13 Link Up: Slot: 0 Port: 28
3 2000/05/09 08:15:12 Link Up: Slot: 0 Port: 48
Clear Log

8.2.1.11 **Configuring SNTP**

Configuring SNTP Global Configuration Page

Configurable Data

Client Mode - Specifies the mode of operation of SNTP Client. An SNTP client may operate in one of the following modes.

- ***Disable***- SNTP is not operational. No SNTP requests are sent from the client nor are any received SNTP messages processed.
- ***Unicast***- SNTP operates in a point to point fashion. A unicast client sends a request to a designated server at its unicast address and expects a reply from which it can determine the time and, optionally the round-trip delay and local clock offset relative to the server.
- ***Broadcast*** - SNTP operates in the same manner as multicast mode but uses a local broadcast address instead of a multicast address. The broadcast address has a single subnet scope while a multicast address has Internet wide scope.

Default value is Disable.

Port - Specifies the local UDP port to listen for responses/broadcasts. Allowed range is (1 to 65535). Default value is 123.

Unicast Poll Interval - Specifies the number of seconds between unicast poll requests expressed as a power of two when configured in unicast mode. Allowed range is (6 to 10). Default value is 6.

Broadcast Poll Interval - Specifies the number of seconds between broadcast poll requests expressed as a power of two when configured in broadcast mode. Broadcasts received prior to the expiry of this interval are discarded. Allowed range is (6 to 10). Default value is 6.

Unicast Poll Timeout - Specifies the number of seconds to wait for an SNTP response when configured in unicast mode. Allowed range is (1 to 30). Default value is 5.

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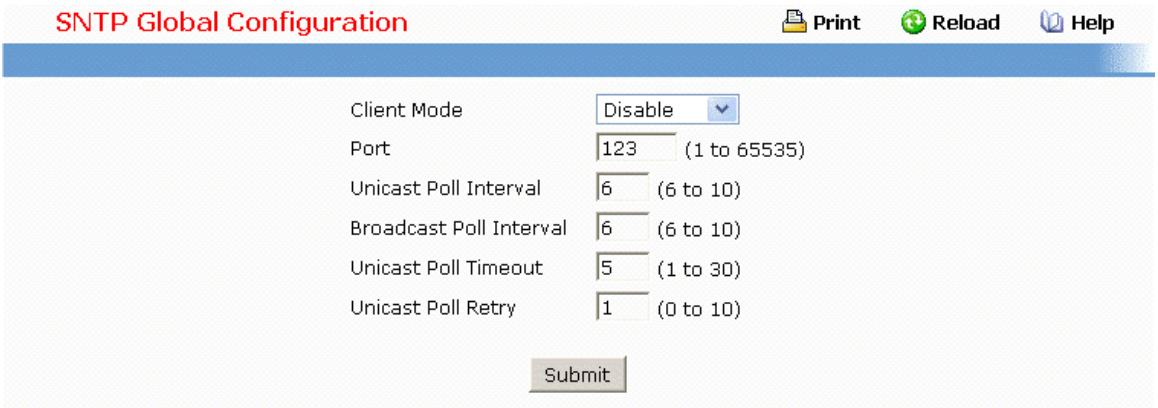
Unicast Poll Retry - Specifies the number of times to retry a request to an SNTP server after the first time-out before attempting to use the next configured server when configured in unicast mode. Allowed range is (0 to 10). Default value is 1.

Command Buttons

Submit - Sends the updated configuration to the switch. Configuration changes take effect immediately.



Viewing SNTP Global Status Page

Non-Configurable Data

Version - Specifies the SNTP Version the client supports.

Supported Mode - Specifies the SNTP modes the client supports. Multiple modes may be supported by a client.

Last Update Time - Specifies the local date and time (UTC) the SNTP client last updated the system clock.

Last Attempt Time - Specifies the local date and time (UTC) of the last SNTP request or receipt of an unsolicited message.

Last Attempt Status - Specifies the status of the last SNTP request or unsolicited message for both unicast and broadcast modes. If no message has been received from a server, a status of Other is displayed. These values are appropriate for all operational modes.

- ***Other***None of the following enumeration values.
- ***Success***The SNTP operation was successful and the system time was updated.
- ***Request Timed Out***A directed SNTP request timed out without receiving a response from the SNTP server.
- ***Bad Date Encoded***The time provided by the SNTP server is not valid.
- ***Version Not Supported***TheSNTP version supported by the server is not compatible with the version supported by the client.
- ***Server Unsychronized***The SNTP server is not synchronized with its peers. This is indicated via the 'leap indicator' field on the SNTP message.

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- ***Server Kiss Of Death***The SNTP server indicated that no further queries were to be sent to this server. This is indicated by a stratum field equal to 0 in a message received from a server.

Server IP Address - Specifies the IP address of the server for the last received valid packet. If no message has been received from any server, an empty string is shown.

Address Type - Specifies the address type of the SNTP Server address for the last received valid packet.

Server Stratum - Specifies the claimed stratum of the server for the last received valid packet.

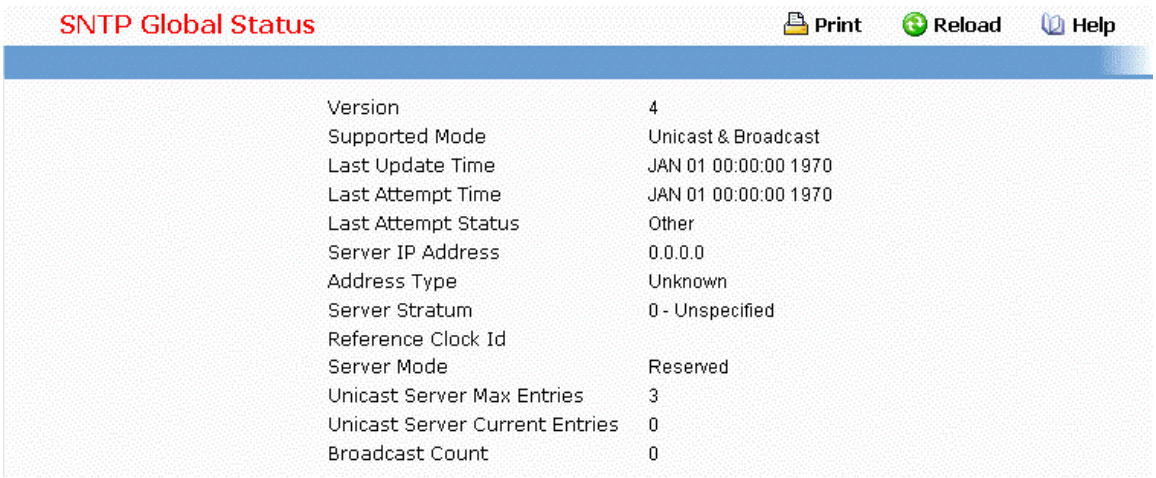
Reference Clock Id - Specifies the reference clock identifier of the server for the last received valid packet.

Server Mode - Specifies the mode of the server for the last received valid packet.

Unicast Sever Max Entries - Specifies the maximum number of unicast server entries that can be configured on this client.

Unicast Server Current Entries - Specifies the number of current valid unicast server entries configured for this client.

Broadcast Count - Specifies the number of unsolicited broadcast SNTP messages that have been received and processed by the SNTP client since last reboot.



Configuring SNTP Server Page

Configurable Data

Server - Specifies all the existing Server Addresses along with an additional option "Create". When the user selects "Create" another text box "Address" appears where the user may enter Address for Server to be configured.

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Address - Specifies the address of the SNTP server. This is a text string of up to 64 characters containing the encoded unicast IP address or hostname of a SNTP server. Unicast SNTP requests will be sent to this address. If this address is a DNS hostname, then that hostname should be resolved into an IP address each time a SNTP request is sent to it.

Address Type - Specifies the address type of the configured SNTP Server address. Allowed types are :

- ***Unknown***
- ***IPV4***
- ***DNS***

Default value is Unknown

Port - Specifies the port on the server to which SNTP requests are to be sent. Allowed range is (1 to 65535). Default value is 123.

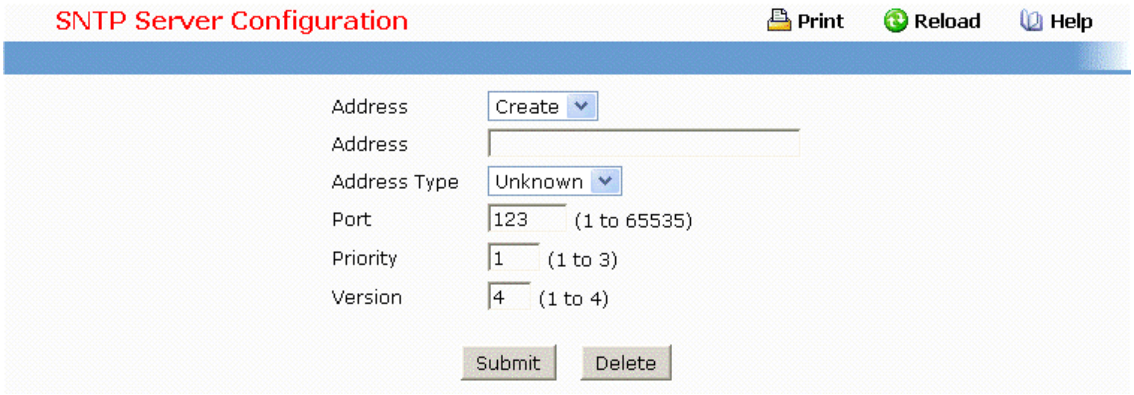
Priority - Specifies the priority of this server entry in determining the sequence of servers to which SNTP requests will be sent. The client continues sending requests to different servers until a successful response is received or all servers are exhausted. This object indicates the order in which to query the servers. A server entry with a precedence of 1 will be queried before a server with a priority of 2, and so forth. If more than one server has the same priority then the requesting order will follow the lexicographical ordering of the entries in this table. Allowed range is (1 to 3). Default value is 1.

Version - Specifies the NTP Version running on the server. Allowed range is (1 to 4). Default value is 4.

Command Buttons

Submit - Sends the updated configuration to the switch. Configuration changes take effect immediately.

Delete - Deletes the SNTP Server entry. Sends the updated configuration to the switch. Configuration changes take effect immediately.



Viewing SNTP Server Status Page

Non-Configurable Data

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Address - Specifies all the existing Server Addresses. If no Server configuration exists, a message saying "No SNTP server exists" flashes on the screen.

Last Update Time - Specifies the local date and time (UTC) that the response from this server was used to update the system clock.

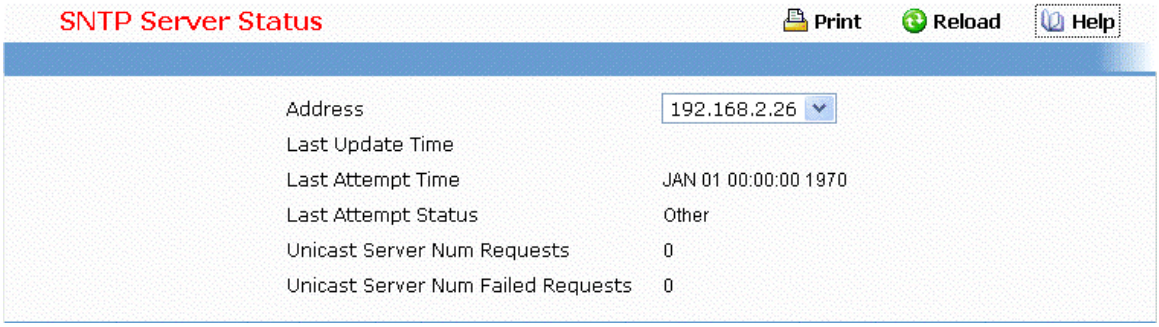
Last Attempt Time - Specifies the local date and time (UTC) that this SNTP server was last queried.

Last Attempt Status - Specifies the status of the last SNTP request to this server. If no packet has been received from this server, a status of Other is displayed.

- ***Other***None of the following enumeration values.
- ***Success***The SNTP operation was successful and the system time was updated.
- ***Request Timed Out***A directed SNTP request timed out without receiving a response from the SNTP server.
- ***Bad Date Encoded***The time provided by the SNTP server is not valid.
- ***Version Not Supported***TheSNTP version supported by the server is not compatible with the version supported by the client.
- ***Server Unsychronized***The SNTP server is not synchronized with its peers. This is indicated via the 'leap indicator' field on the SNTP message.
- ***Server Kiss Of Death***The SNTP server indicated that no further queries were to be sent to this server. This is indicated by a stratum field equal to 0 in a message received from a server.

Unicast Server Num Requests - Specifies the number of SNTP requests made to this server since last time agent reboot.

Unicast Server Num Failed Requests - Specifies the number of failed SNTP requests made to this server since last reboot.



Configuring Current Time Settings Page

Configurable Data

Year - Year (4-digit). (Range: 2000 - 2099).

Month - Month. (Range: 1 - 12).

Day - Day of month. (Range: 1 - 31).

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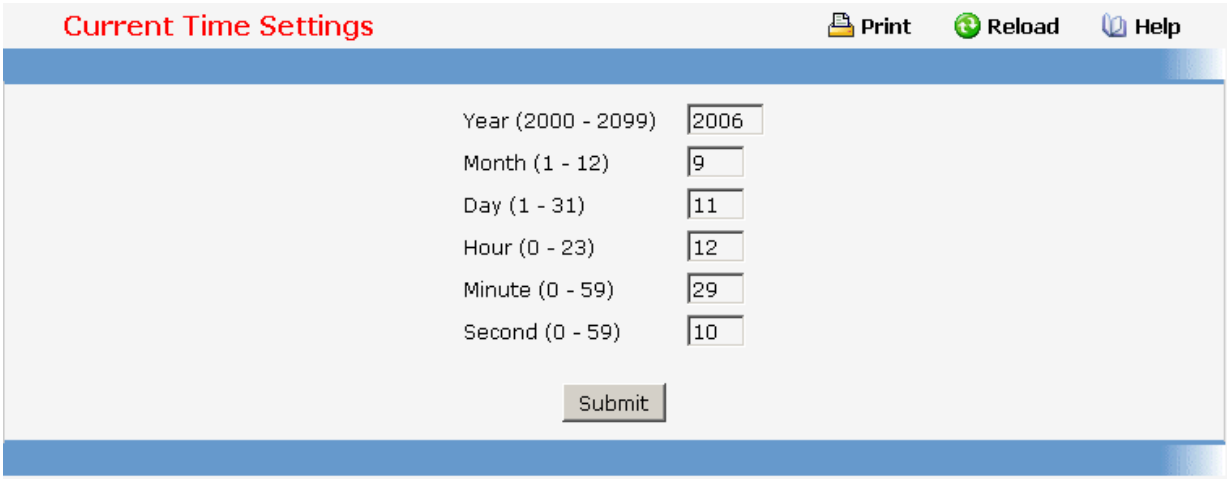
Hour - Hour in 24-hour format. (Range: 0 - 23).

Minute - Minute. (Range: 0 - 59).

Second - Second. (Range: 0 - 59).

Command Buttons

Submit - Send the updated screen to the switch. Changes take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.



Configuring Time Zone Settings Page

Simple Network Time Protocol (SNTP) allows the switch to set its internal clock based on periodic updates from a time server. Maintaining an accurate time on the switch enables the system log to record meaningful dates and times for event entries. You can also manually set the clock using the CLI. If the clock is not set, the switch will only record the time from the factory default set at the last bootup.

Configurable Data

Time Zone Name - The name of time zone, usually an acronym. (Range: 1-15 characters).

Time Zone Hours - The number of hours before/after UTC. (Range: 0-12 hours).

Time Zone Minutes - The number of minutes before/after UTC. (Range: 0-59 minutes).

- before-utc - Sets the local time zone before (east) of UTC
- after-utc - Sets the local time zone after (west) of UTC

Command Buttons

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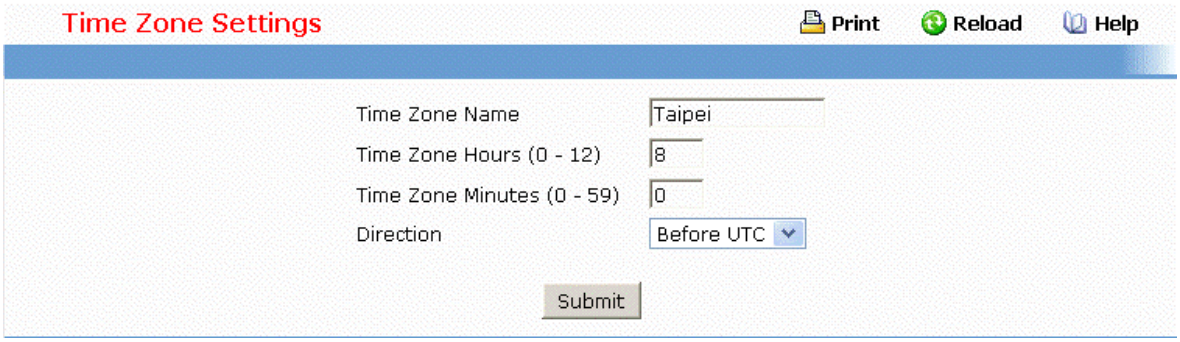
Submit - Send the updated screen to the switch. Changes take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.



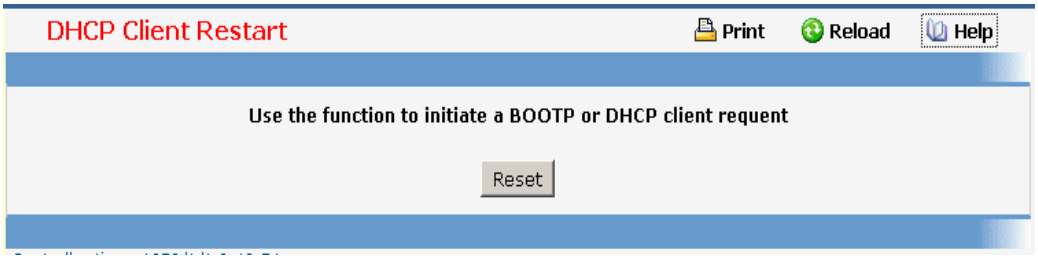
8.2.1.12 **Defining DHCP Client**

Configuring DHCP Restart Page

This command issues a BOOTP or DHCP client request for any IP interface that has been set to BOOTP or DHCP mode via the IP address command. DHCP requires the server to reassign the client's last address if available. If the BOOTP or DHCP server has been moved to a different domain, the network portion of the address provided to the client will be based on this new domain.

Command Buttons

Reset - Send the updated screen to the switch to restart the DHCP client.



Configuring DHCP Client-identifier Page

Specify the DCHP client identifier for the switch. The DCHP client identifier is used to include a client identifier in all communications with the DHCP server. The identifier type depends on the requirements of your DHCP server.

Non-Configurable Data

Current DHCP Identifier (Hex/Text) - Shows the current setting of DHCP identifier.

Configurable Data

DHCP Identifier - Specifies the type of DHCP Identifier.

- ***Default***

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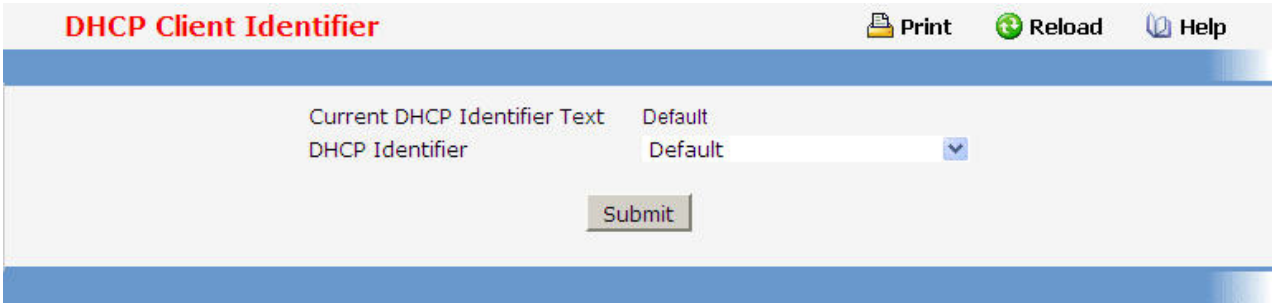
- ***Specific Text String***
- ***Specific Hexadecimal Value***

Text String - A text string.

Hex Value - The hexadecimal value.

Command Buttons

Submit - Send the updated screen to the switch perform the setting DHCP client identifier.



8.2.2 *Switching Menu*

8.2.2.1 Managing Port-based VLAN

Configuring Port-based VLAN Configuration Page

Selection Criteria

VLAN ID and Name - You can use this screen to reconfigure an existing VLAN, or to create a new one. Use this pull down menu to select one of the existing VLANs, or select 'Create' to add a new one.

Configurable Data

VLAN ID - Specify the VLAN Identifier for the new VLAN. (You can only enter data in this field when you are creating a new VLAN.) The range of the VLAN ID is (1 to 3965).

VLAN Name - Use this optional field to specify a name for the VLAN. It can be up to 32 alphanumeric characters, including blanks. The default is blank. VLAN ID 1 always has a name of 'Default'.

VLAN Type - This field identifies the type of the VLAN you are configuring. You cannot change the type of the default VLAN (VLAN ID = 1): it is always type 'Default'. When you create a VLAN, using this screen, its type will always be 'Static'. A VLAN that is created by GVRP registration initially has a type of 'Dynamic'. You may use this pull down menu to change its type to 'Static'.

Participation - Use this field to specify whether a port will participate in this VLAN. The factory default is 'Autodetect'. The possible values are:

- Include - This port is always a member of this VLAN. This is equivalent to registration fixed in the IEEE 802.1Q standard.
- Exclude - This port is never a member of this VLAN. This is equivalent to registration forbidden in the IEEE 802.1Q standard.

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- Autodetect - Specifies that port may be dynamically registered in this VLAN via GVRP. The port will not participate in this VLAN unless it receives a GVRP request. This is equivalent to registration normal in the IEEE 802.1Q standard.

Tagging - Select the tagging behavior for this port in this VLAN. The factory default is 'Untagged'. The possible values are:

Tagged - all frames transmitted for this VLAN will be tagged.

Untagged - all frames transmitted for this VLAN will be untagged.

Non-Configurable Data

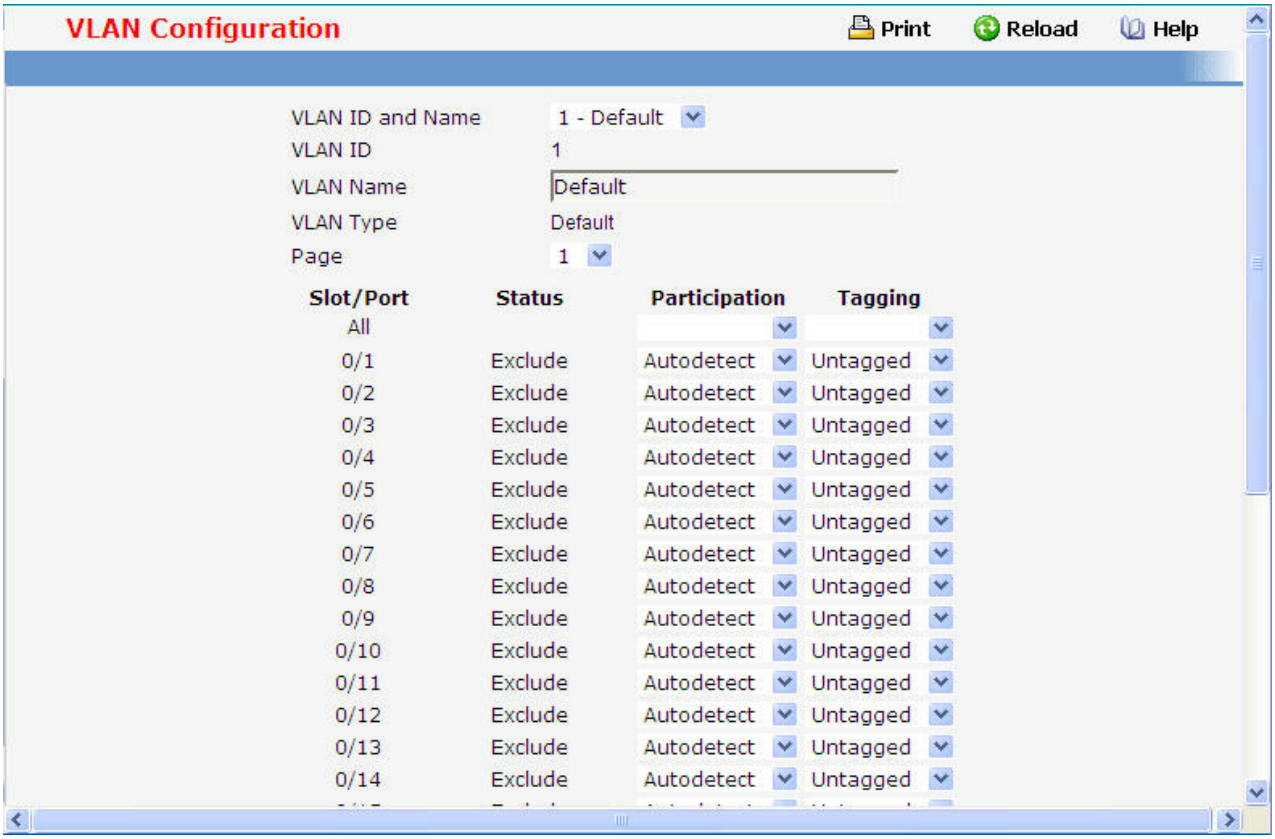
Slot/Port - Indicates which port is associated with the fields on this line.

Status - Indicates the current value of the participation parameter for the port.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Delete this VLAN. You are not allowed to delete the default VLAN.



Viewing Port-based VLAN Information Page

This page displays the status of all currently configured VLANs.

VLAN ID - The VLAN Identifier (VID) of the VLAN. The range of the VLAN ID is (1 to 3965).

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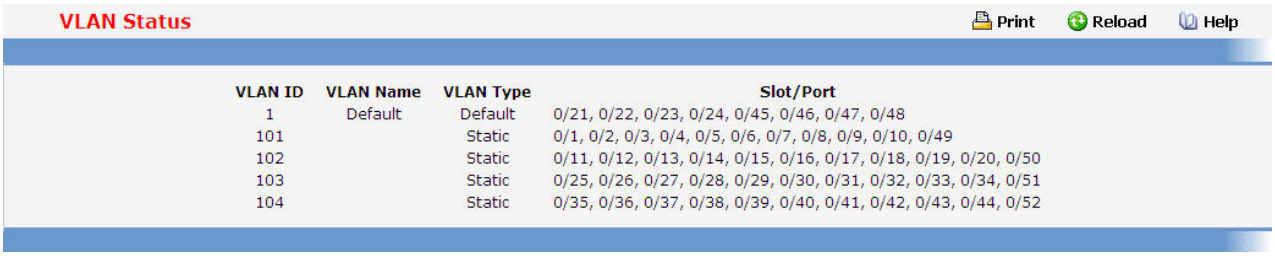
VLAN Name - The name of the VLAN. VLAN ID 1 is always named `Default`.

VLAN Type - The VLAN type:

Default (VLAN ID = 1) -- always present

Static -- a VLAN you have configured

Dynamic -- a VLAN created by GVRP registration that you have not converted to static, and that GVRP may therefore remove.



Configuring VLAN Port Configuration Page

Selection Criteria

Slot/Port - Select the physical interface for which you want to display or configure data. Select 'All' to set the parameters for all ports to same values.

Configurable Data

Port VLAN ID - Specify the VLAN ID you want assigned to untagged or priority tagged frames received on this port. The factory default is 1.

Acceptable Frame Types - Specify how you want the port to handle untagged and priority tagged frames. If you select 'VLAN only', the port will discard any untagged or priority tagged frames it receives. If you select 'Admit All', untagged and priority tagged frames received on the port will be accepted and assigned the value of the Port VLAN ID for this port. Whichever you select, VLAN tagged frames will be forwarded in accordance with the IEEE 802.1Q VLAN standard. The factory default is 'Admit All'.

Ingress Filtering - Specify how you want the port to handle tagged frames. If you enable Ingress Filtering on the pull down menu, a tagged frame will be discarded if this port is not a member of the VLAN identified by the VLAN ID in the tag. If you select disable from the pull down menu, all tagged frames will be accepted. The factory default is disabled.

Port Priority - Specify the default 802.1p priority assigned to untagged packets arriving at the port.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

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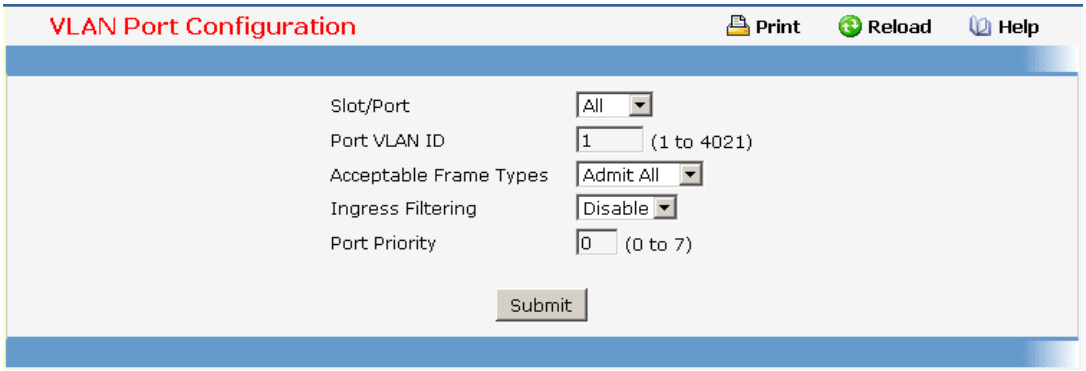

Viewing VLAN Port Summary Page

Non-Configurable Data

Slot/Port - The interface.

Port VLAN ID - The VLAN ID that this port will assign to untagged frames or priority tagged frames received on this port.

Acceptable Frame Types - Specifies the types of frames that may be received on this port. The options are 'VLAN only' and 'Admit All'. When set to 'VLAN only', untagged frames or priority tagged frames received on this port are discarded. When set to 'Admit All', untagged frames or priority tagged frames received on this port are accepted and assigned the value of the Port VLAN ID for this port. With either option, VLAN tagged frames are forwarded in accordance to the 802.1Q VLAN specification.

Ingress Filtering - When enabled, the frame is discarded if this port is not a member of the VLAN with which this frame is associated. In a tagged frame, the VLAN is identified by the VLAN ID in the tag. In an untagged frame, the VLAN is the Port VLAN ID specified for the port that received this frame. When disabled, all frames are forwarded in accordance with the 802.1Q VLAN bridge specification. The factory default is disabled.

Port Priority - Specifies the default 802.1p priority assigned to untagged packets arriving at the port.

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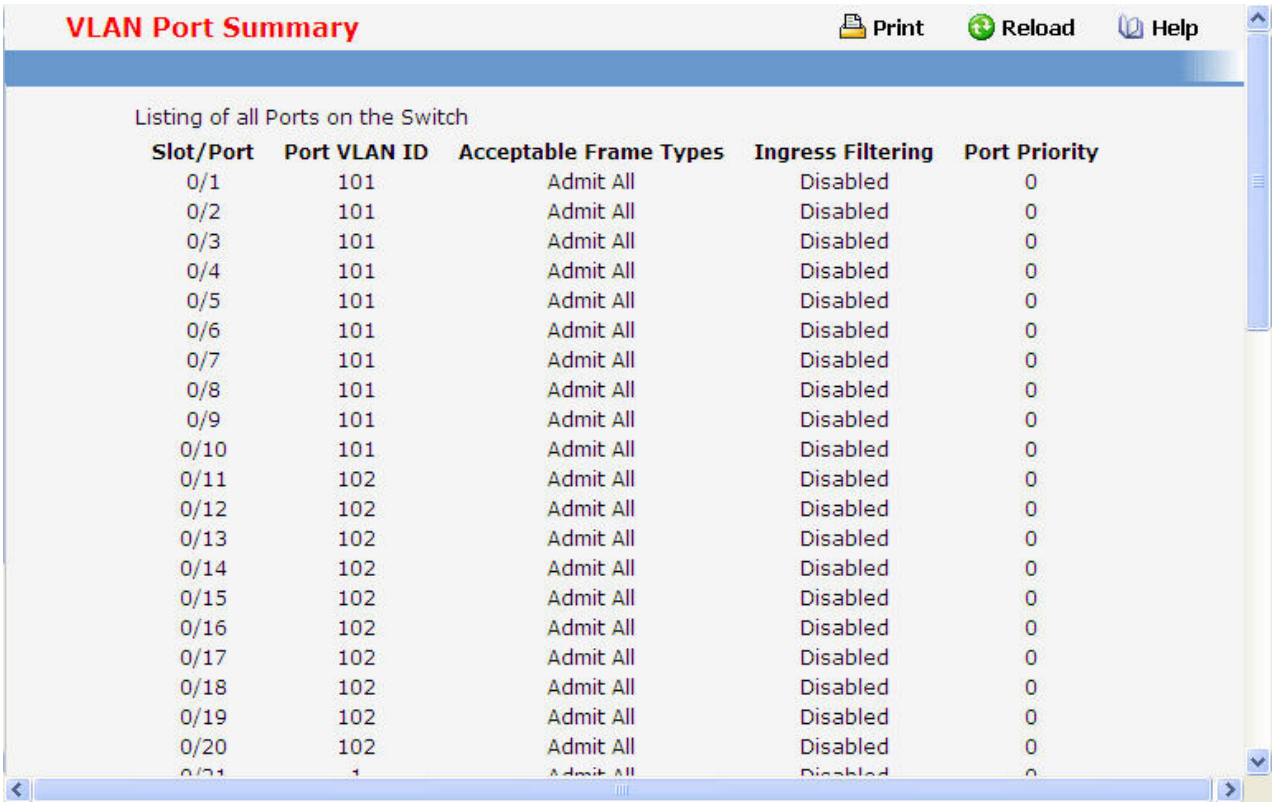
VLAN Port Summary
Print
Reload
Help
Listing of all Ports on the Switch
Slot/Port Port VLAN ID Acceptable Frame Types Ingress Filtering Port Priority
0/1 101 Admit All Disabled 0
0/2 101 Admit All Disabled 0
0/3 101 Admit All Disabled 0
0/4 101 Admit All Disabled 0
0/5 101 Admit All Disabled 0
0/6 101 Admit All Disabled 0
0/7 101 Admit All Disabled 0
0/8 101 Admit All Disabled 0
0/9 101 Admit All Disabled 0
0/10 101 Admit All Disabled 0
0/11 102 Admit All Disabled 0
0/12 102 Admit All Disabled 0
0/13 102 Admit All Disabled 0
0/14 102 Admit All Disabled 0
0/15 102 Admit All Disabled 0
0/16 102 Admit All Disabled 0
0/17 102 Admit All Disabled 0
0/18 102 Admit All Disabled 0
0/19 102 Admit All Disabled 0
0/20 102 Admit All Disabled 0

Resetting VLAN Configuration Page

Command Buttons

Reset - If you select this button and confirm your selection on the next screen, all VLAN configuration parameters will be reset to their factory default values. Also, all VLANs, except for the default VLAN, will be deleted. The factory default values are:

- All ports are assigned to the default VLAN of 1.
- All ports are configured with a PVID of 1.
- All ports are configured to an Acceptable Frame Types value of Admit All Frames.
- All ports are configured with Ingress Filtering disabled.
- All ports are configured to transmit only untagged frames.
- GVRP is disabled on all ports and all dynamic entries are cleared.
- GVRP is disabled for the switch and all dynamic entries are cleared.
- GMRP is disabled on all ports and all dynamic entries are cleared.
- GMRP is disabled for the switch and all dynamic entries are cleared.

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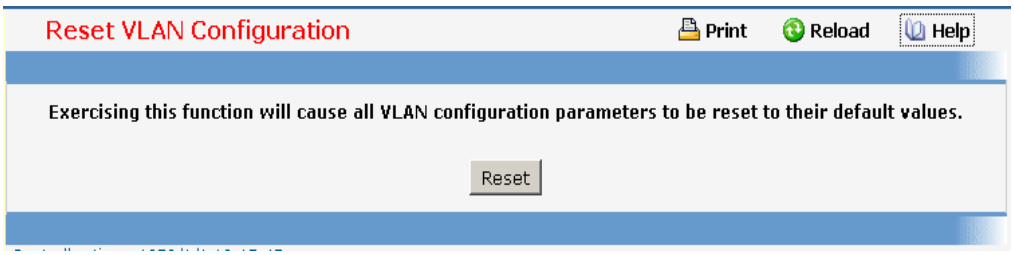

8.2.2.2 **Managing Protocol-based VLAN**

Protocol-based VLAN Configuration Page

You can use a protocol-based VLAN to define filtering criteria for untagged packets. By default, if you do not configure any port- (IEEE 802.1Q) or protocol-based VLANs, untagged packets will be assigned to VLAN 1. You can override this behavior by defining either port-based VLANs or protocol-based VLANs, or both. Tagged packets are always handled according to the IEEE 802.1Q standard, and are not included in protocol-based VLANs.

If you assign a port to a protocol-based VLAN for a specific protocol, untagged frames received on that port for that protocol will be assigned the protocol-based VLAN ID. Untagged frames received on the port for other protocols will be assigned the Port VLAN ID - either the default PVID (1) or a PVID you have specifically assigned to the port using the Port VLAN Configuration screen.

You define a protocol-based VLAN by creating a group. Each group has a one-to-one relationship with a VLAN ID, can include one to three protocol definitions, and can include multiple ports. When you create a group you will choose a name and a Group ID will be assigned automatically.

Selection Criteria

Group ID - You can use this screen to reconfigure or delete an existing protocol-based VLAN, or create a new one. Use this pull down menu to select one of the existing PBVLANs, or select 'Create' to add a new one. A Group ID number will be assigned automatically when you create a new group. You can create up to 128 groups.

Configurable Data

Group Name - Use this field to assign a name to a new group. You may enter up to 16 characters.

Protocol(s) - Select the protocols you want to be associated with the group. There are three configurable protocols: IP, IPX, and ARP. Hold down the control key to select more than one protocol.

IP - IP is a network layer protocol that provides a connectionless service for the delivery of data.

ARP - Address Resolution Protocol (ARP) is a low-level protocol that dynamically maps network layer addresses to physical medium access control (MAC) addresses

IPX - The Internetwork Packet Exchange (IPX) is a connectionless datagram Network-layer protocol that forwards data over a network.

VLAN - VLAN can be any number in the range of (1 to 3965) . All the ports in the group will assign this VLAN ID to untagged packets received for the protocols you included in this group.

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Slot/Port(s) - Select the interface(s) you want to be included in the group. Note that a given interface can only belong to one group for a given protocol. If you have already added interface 0.1 to a group for IP, you cannot add it to another group that also includes IP, although you could add it to a new group for IPX.

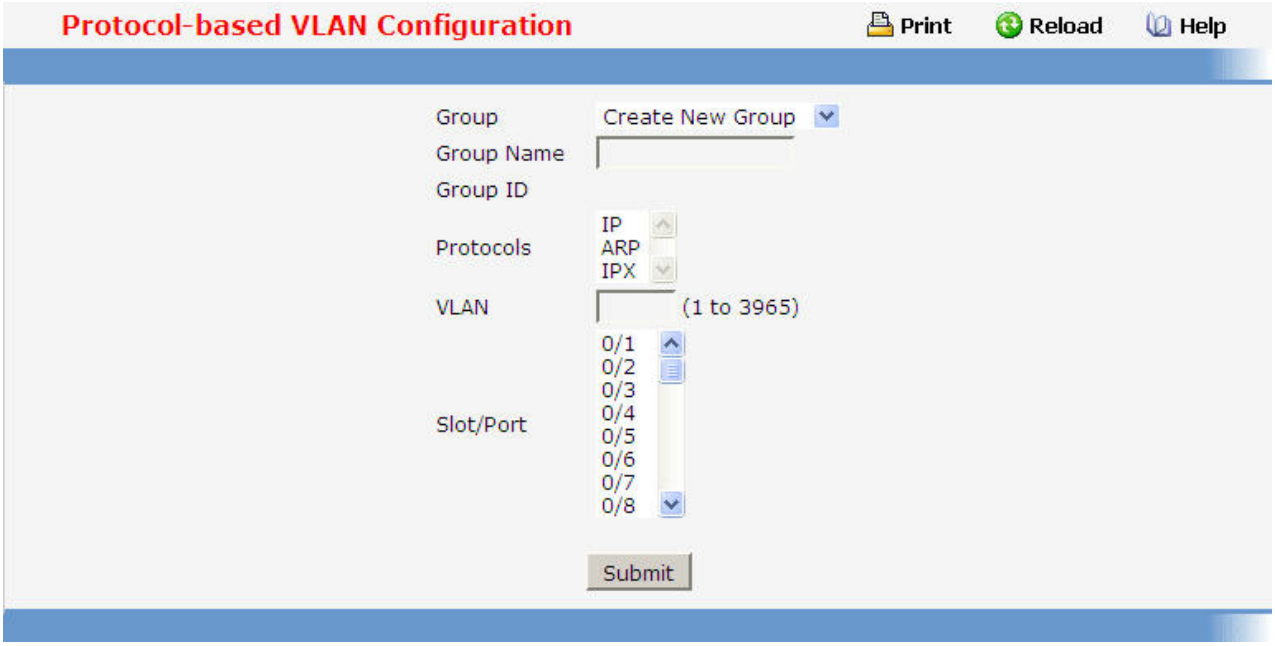
Non-Configurable Data

Group ID - A number used to identify the group created by the user. Group IDs are automatically assigned when a group is created by the user.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Remove the Protocol Based VLAN group identified by the value in the Group ID field. If you want the switch to retain the deletion across a power cycle, you must perform a save.



Viewing Protocol-based VLAN Information Page

Non-Configurable Data

Group Name - The name associated with the group. Group names can be up to 16 characters. The maximum number of groups allowed is 128.

Group ID - The number used to identify the group. It was automatically assigned when you created the group.

Protocol(s) - The protocol(s) that belongs to the group. There are three configurable protocols: IP, IPX, and ARP.

IP - IP is a network layer protocol that provides a connectionless service for the delivery of data.

ARP - Address Resolution Protocol (ARP) is a low-level protocol that dynamically maps network layer addresses to physical medium access control (MAC) addresses.

IPX - The Internetwork Packet Exchange (IPX) is a connectionless datagram Network-layer protocol that forwards data over a network.

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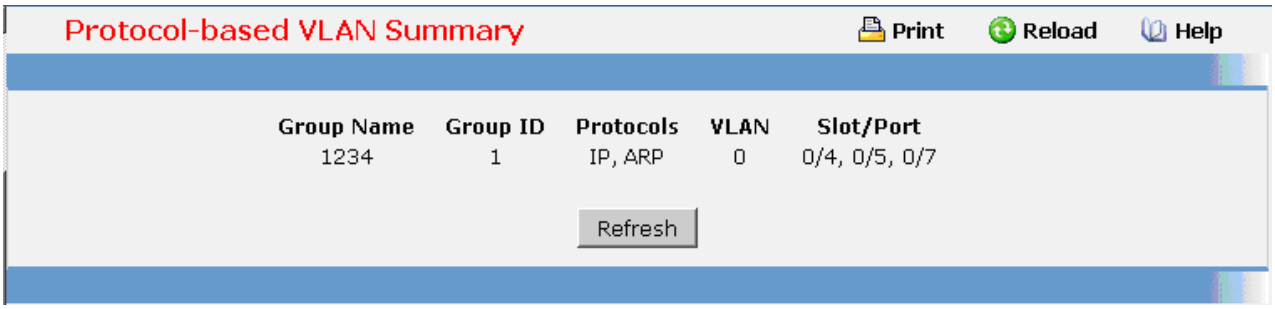
VLAN - The VLAN ID associated with the group.

Slot/Port(s) - The interfaces associated with the group.

Command Buttons

Refresh - Update the screen with the latest information.



8.2.2.3 **Defining GARP**

Viewing GARP Information Page

This screen shows the GARP Status for the switch and for the individual ports. Note that the timers are only relevant when the status for a port shows as enabled.

Non-Configurable Data

Switch GVRP - Indicates whether the GARP VLAN Registration Protocol administrative mode for this switch is enabled or disabled. The factory default is disabled.

Switch GMRP - Indicates whether the GARP Multicast Registration Protocol administrative mode for this switch, enabled or disabled. The factory default is disabled.

Slot/Port - Slot/Port of the interface.

Port GVRP Mode - Indicates whether the GVRP administrative mode for the port is enabled or disabled. The factory default is disabled.

Port GMRP Mode - Indicates whether the GMRP administrative mode for the port is enabled or disabled. The factory default is disabled.

Join Time (centiseconds) - Specifies the time between the transmission of GARP PDUs registering (or re-registering) membership for a VLAN or multicast group in centiseconds. An instance of this timer exists for each GARP participant for each port. Permissible values are 10 to 100 centiseconds (0.1 to 1.0 seconds). The factory default is 20 centiseconds (0.2 seconds).

Leave Time (centiseconds) - Specifies the time to wait after receiving an unregister request for a VLAN or multicast group before deleting the associated entry, in centiseconds. This allows time for another station to assert registration for the same attribute in order to maintain uninterrupted service. An instance of this timer exists for each GARP participant for each port. Permissible values are 20 to 600 centiseconds (0.2 to 6.0 seconds). The factory default is 60 centiseconds (0.6 seconds).

Leave All Time (centiseconds) -This Leave All Time controls how frequently LeaveAll PDUs are generated. A LeaveAll PDU indicates that all registrations will shortly be deregistered. Participants will need to rejoin in order to maintain registration. An instance of this timer exists for each GARP participant for each port. The Leave All Period Timer is set to a random value in the range of LeaveAllTime to

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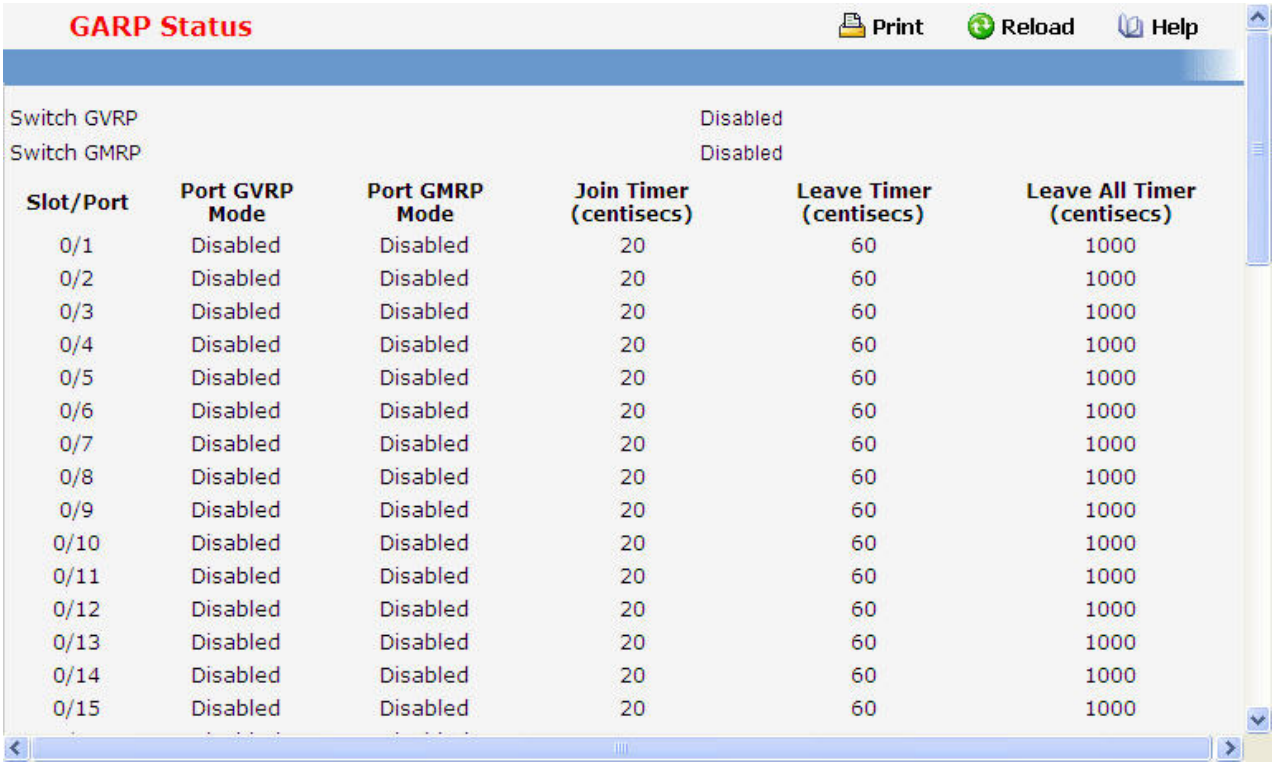
1.5*LeaveAllTime. Permissible values are 200 to 6000 centiseconds (2 to 60 seconds). The factory default is 1000 centiseconds (10 seconds).



Slot/Port	Port GVRP Mode	Port GMRP Mode	Join Timer (centisecs)	Leave Timer (centisecs)	Leave All Timer (centisecs)
0/1	Disabled	Disabled	20	60	1000
0/2	Disabled	Disabled	20	60	1000
0/3	Disabled	Disabled	20	60	1000
0/4	Disabled	Disabled	20	60	1000
0/5	Disabled	Disabled	20	60	1000
0/6	Disabled	Disabled	20	60	1000
0/7	Disabled	Disabled	20	60	1000
0/8	Disabled	Disabled	20	60	1000
0/9	Disabled	Disabled	20	60	1000
0/10	Disabled	Disabled	20	60	1000
0/11	Disabled	Disabled	20	60	1000
0/12	Disabled	Disabled	20	60	1000
0/13	Disabled	Disabled	20	60	1000
0/14	Disabled	Disabled	20	60	1000
0/15	Disabled	Disabled	20	60	1000

Configuring the whole Switch GARP Configuration Page

Note: It can take up to 10 seconds for GARP configuration changes to take effect.

Configurable Data

GVRP Mode - Choose the GARP VLAN Registration Protocol administrative mode for the switch by selecting enable or disable from the pull down menu. The factory default is disabled.

GMRP Mode - Choose the GARP Multicast Registration Protocol administrative mode for the switch by selecting enable or disable from the pull down menu. The factory default is disabled.

Command Buttons

Submit - Update the switch with the values you entered. If you want the switch to retain the new values across a power cycle you must perform a save.

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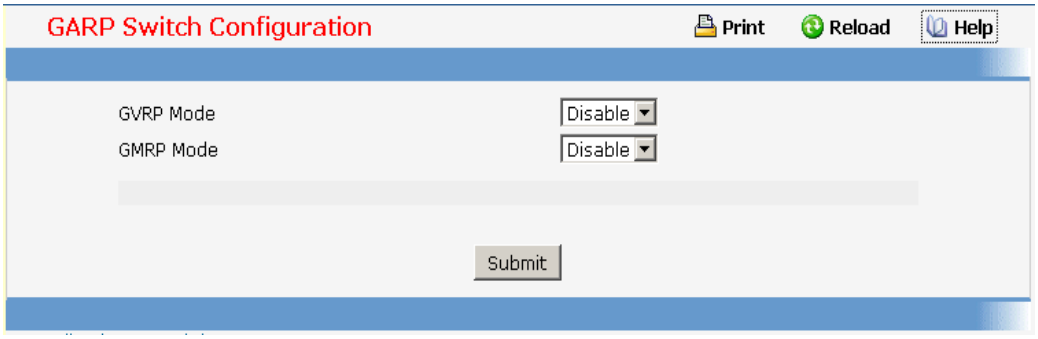

Configuring each Port GARP Configuration Page

Note: It can take up to 10 seconds for GARP configuration changes to take effect.

Selection Criteria

Slot/Port - Select the physical interface for which data is to be displayed or configured. It is possible to set the parameters for all ports by selecting 'All'.

Configurable Data

Port GVRP Mode - Choose the GARP VLAN Registration Protocol administrative mode for the port by selecting enable or disable from the pull down menu. If you select disable, the protocol will not be active and the Join Time, Leave Time, and Leave All Time will have no effect. The factory default is disabled.

Port GMRP Mode - Choose the GARP Multicast Registration Protocol administrative mode for the port by selecting enable or disable from the pull down menu. If you select disable, the protocol will not be active, and Join Time, Leave Time, and Leave All Time have no effect. The factory default is disabled.

Join Time (centiseconds) - Specify the time between the transmission of GARP PDUs registering (or re-registering) membership for a VLAN or multicast group in centiseconds. Enter a number between 10 and 100 (0.1 to 1.0 seconds). The factory default is 20 centiseconds (0.2 seconds). An instance of this timer exists for each GARP participant for each port.

Leave Time (centiseconds) - Specify the time to wait after receiving an unregister request for a VLAN or multicast group before deleting the associated entry, in centiseconds. This allows time for another station to assert registration for the same attribute in order to maintain uninterrupted service. Enter a number between 20 and 600 (0.2 to 6.0 seconds). The factory default is 60 centiseconds (0.6 seconds). An instance of this timer exists for each GARP participant for each port.

Leave All Time (centiseconds) - The Leave All Time controls how frequently LeaveAll PDUs are generated. A LeaveAll PDU indicates that all registrations will shortly be deregistered. Participants will need to rejoin in order to maintain registration. The Leave All Period Timer is set to a random value in the range of LeaveAllTime to 1.5*LeaveAllTime. The timer is specified in centiseconds. Enter a number between 200 and 6000 (2 to 60 seconds). The factory default is 1000 centiseconds (10 seconds). An instance of this timer exists for each GARP participant for each port.

Command Buttons

Submit - Update the switch with the values you entered. If you want the switch to retain the new values across a power cycle you must perform a save.

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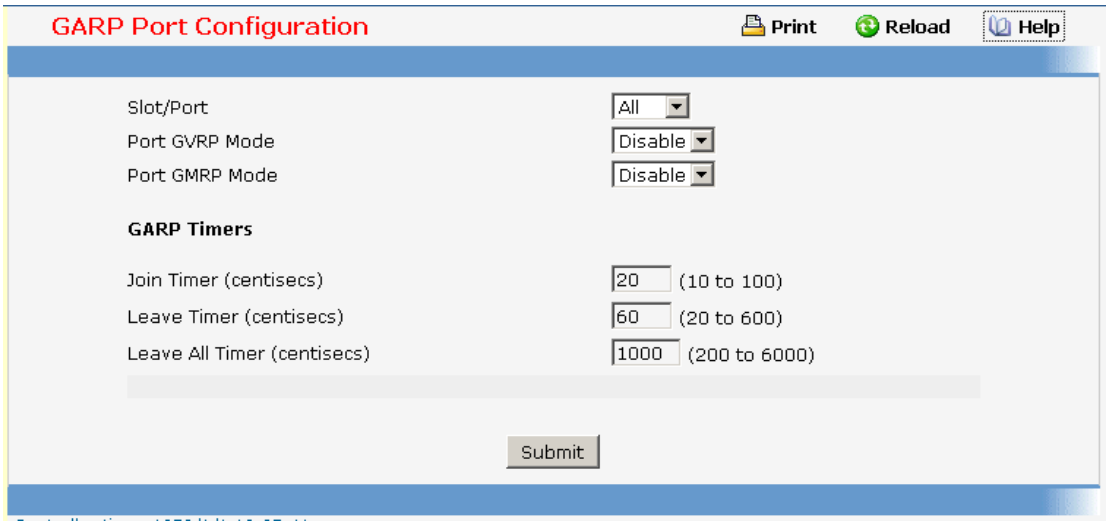

8.2.2.4 **Managing IGMP Snooping**

Configuring IGMP Snooping Global Configuration Page

Use this menu to configure the parameters for IGMP Snooping, which is used to build forwarding lists for multicast traffic. Note that only a user with Read/Write access privileges may change the data on this screen.

Configurable Data

Admin Mode - Select the administrative mode for IGMP Snooping for the switch from the pulldown menu. The default is disable.

Non-Configurable Data

Multicast Control Frame Count - The number of multicast control frames that are processed by the CPU.

Interfaces Enabled for IGMP Snooping - A list of all the interfaces currently enabled for IGMP Snooping.

Data Frames Forwarded by the CPU - The number of data frames forwarded by the CPU.

VLAN Ids Enabled For IGMP Snooping - Displays VLAN Ids enabled for IGMP snooping.

Command Buttons

Submit - Update the switch with the values you entered. If you want the switch to retain the new values across a power cycle you must perform a save. You will only see this button if you have Read/Write access privileges.

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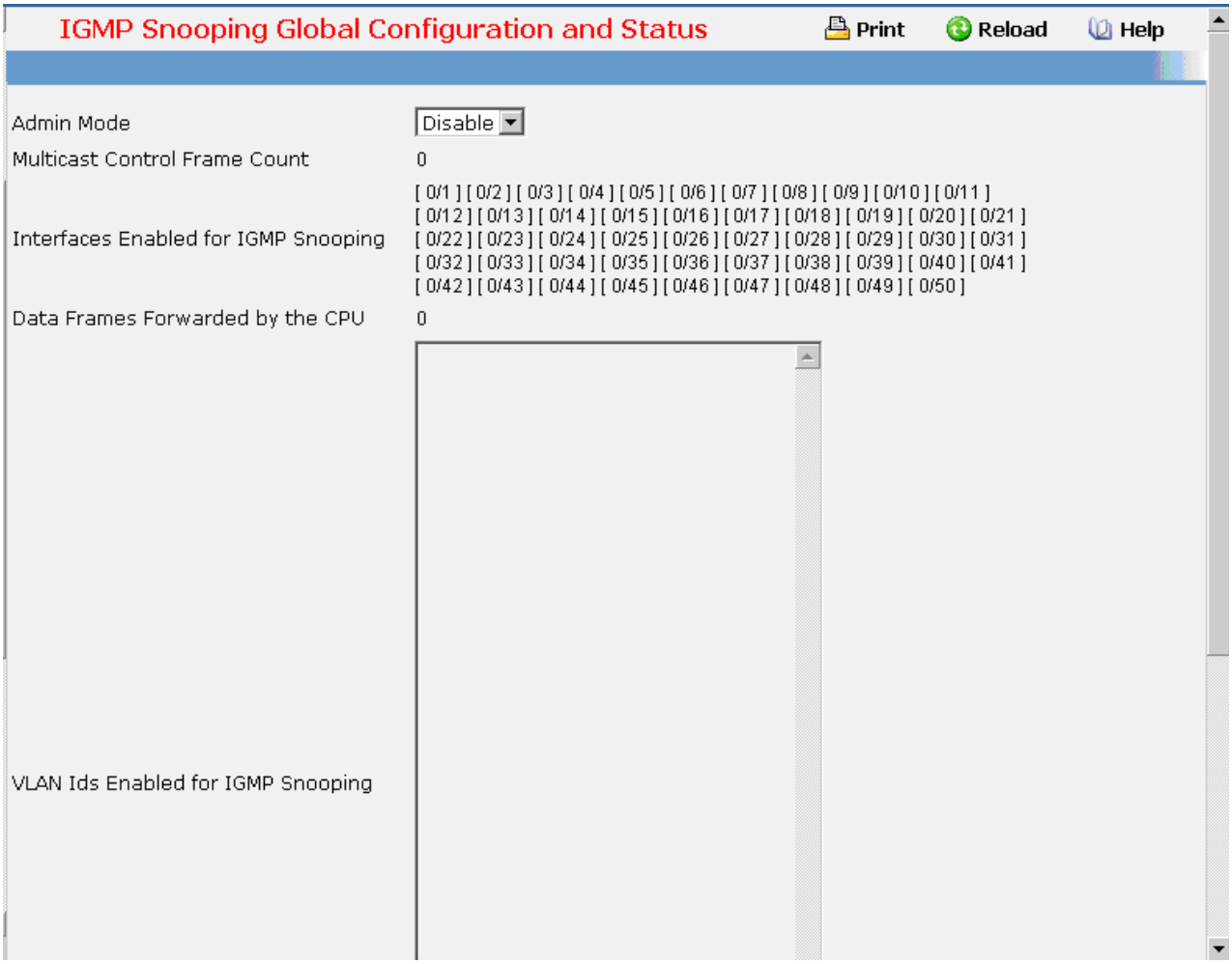
IGMP Snooping Global Configuration and Status
Print
Reload
Help
Admin Mode
Disable
Multicast Control Frame Count
0
Interfaces Enabled for IGMP Snooping
[0/1] [0/2] [0/3] [0/4] [0/5] [0/6] [0/7] [0/8] [0/9] [0/10] [0/11]
[0/12] [0/13] [0/14] [0/15] [0/16] [0/17] [0/18] [0/19] [0/20] [0/21]
[0/22] [0/23] [0/24] [0/25] [0/26] [0/27] [0/28] [0/29] [0/30] [0/31]
[0/32] [0/33] [0/34] [0/35] [0/36] [0/37] [0/38] [0/39] [0/40] [0/41]
[0/42] [0/43] [0/44] [0/45] [0/46] [0/47] [0/48] [0/49] [0/50]
Data Frames Forwarded by the CPU
0
VLAN Ids Enabled for IGMP Snooping

Defining IGMP Snooping Interface Configuration Page

Configurable Data

Slot/Port - The single select box lists all physical ,VLAN and LAG interfaces. Select the interface you want to configure.

Admin Mode - Select the interface mode for the selected interface for IGMP Snooping for the switch from the pulldown menu. The default is disable.

Group Membership Interval - Specify the amount of time you want the switch to wait for a report for a particular group on a particular interface before it deletes that interface from the group. Enter a value between 1 and 3600 seconds. The default is 260 seconds.

Max Response Time - Specify the amount of time you want the switch to wait after sending a query on an interface because it did not receive a report for a particular group on that interface. Enter a value greater or equal to 1 and less than the Group Membership Interval in seconds. The default is 10 seconds. The configured value must be less than the Group Membership Interval.

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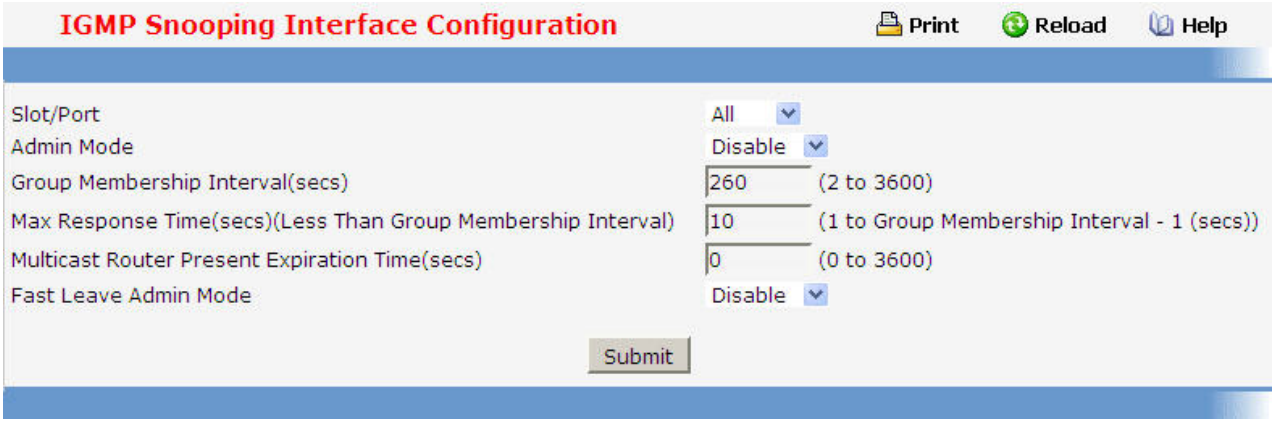
Multicast Router Present Expiration Time - Specify the amount of time you want the switch to wait to receive a query on an interface before removing it from the list of interfaces with multicast routers attached. Enter a value between 0 and 3600 seconds. The default is 0 seconds. A value of zero indicates an infinite timeout, i.e. no expiration.

Fast Leave Admin mode - Select the Fast Leave mode for the a particular interface from the pulldown menu. The default is disable.

Command Buttons

Submit - Update the switch with the values you entered. If you want the switch to retain the new values across a power cycle you must perform a save. You will only see this button if you have Read/Write access privileges.



Viewing IGMP Snooping VLAN Status Page

Non-Configurable Data

VLAN ID - All Vlan Ids for which the IGMP Snooping mode is Enabled.

Admin Mode - Igmp Snooping Mode for Vlan ID.

Fast Leave Admin Mode - Fast Leave Mode for Vlan ID.

Group Membership Interval - Group Membership Interval of IGMP Snooping for the specified VLAN ID. Valid range is 2 to 3600.

Maximum Response Time - Maximum Response Time of IGMP Snooping for the specified VLAN ID. Valid range is 1 to 3599.Its value should be greater than group membership interval value.

Multicast Router Expiry Time - Multicast Router Expiry Time of IGMP Snooping for the specified VLAN ID. Valid range is 0 to 3600.

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Configuring IGMP Snooping VLAN Page

Configurable Data

VLAN ID - Specifies list of VLAN IDs for which IGMP Snooping is enabled.

VLAN ID - Appears when "New Entry" is selected in VLAN ID combo box. Specifies VLAN ID for which pre-configurable Snooping parameters are to be set.

Admin Mode - Enable or disable the Igmp Snooping for the specified VLAN ID.

Fast Leave Admin Mode - Enable or disable the Igmp Snooping Fast Leave Mode for the specified VLAN ID.

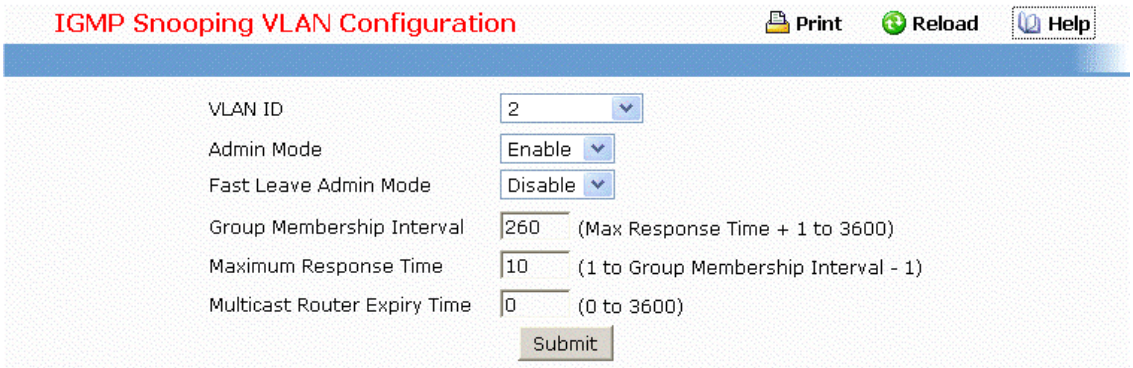
Group Membership Interval - Sets the value for group membership interval of IGMP Snooping for the specified VLAN ID. Valid range is (Maximum Response Time + 1) to 3600.

Maximum Response Time - Sets the value for maximum response time of IGMP Snooping for the specified VLAN ID. Valid range is 1 to (Group Membership Interval - 1).Its value should be greater than group membership interval value.

Multicast Router Expiry Time - Sets the value for multicast router expiry time of IGMP Snooping for the specified VLAN ID. Valid range is 0 to 3600.

Command Buttons

Submit - Update the switch with the values you entered.



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Viewing Multicast Router Statistics Page

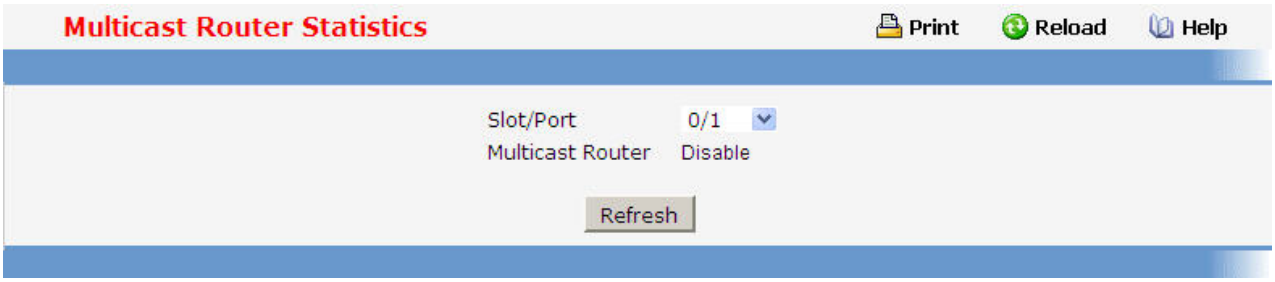
Non-Configurable Data

Slot/Port - The single select box lists all physical and LAG interfaces. Select the interface for which you want to display the statistics.

Multicast Router - Specifies for the selected interface whether multicast router is enable or disabled.

Command Buttons

Refresh - Refetch the database and display it again starting with the first entry in the table.



Configuring Multicast Router Page

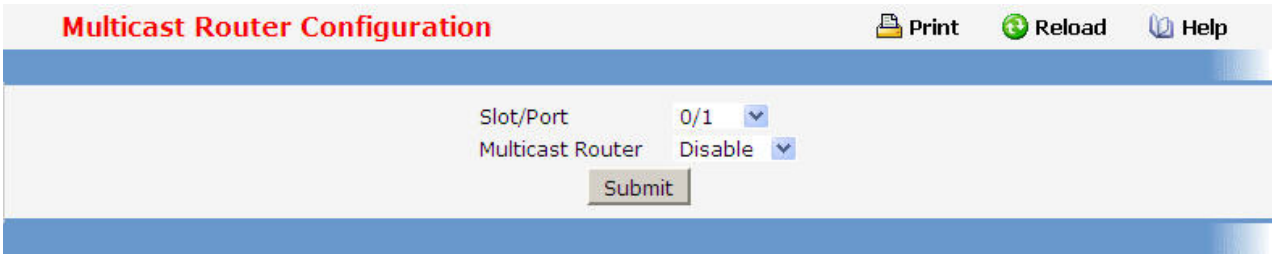
Configurable Data

Slot/Port - The select box lists all Slot/Ports. Select the interface for which you want Multicast Router to be enabled .

Multicast Router - Enable or disable Multicast Router on the selected Slot/Port.

Command Buttons

Submit - Update the switch with the values you entered.



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Viewing Multicast Router VLAN Statistics Page

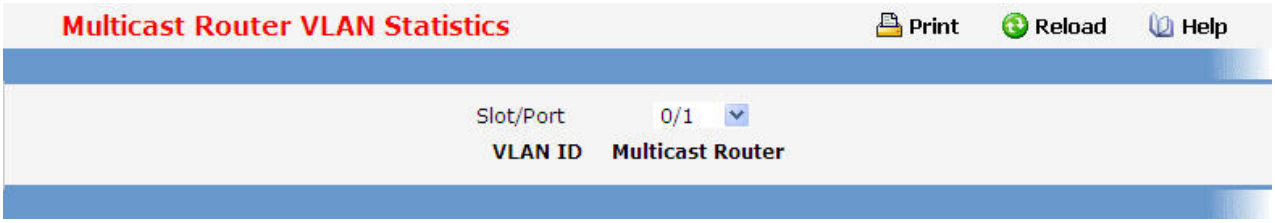
Selection Criteria

Slot/Port - The select box lists all Slot/Ports. Select the interface for which you want to display the statistics.

Non-Configurable Data

VLAN ID - All Vlan Ids for which the Multicast Router Mode is Enabled

Multicast Router - Multicast Router Mode for Vlan ID.



Configuring Multicast Router VLAN Page

Selection Criteria

Slot/Port - The select box lists all Slot/Ports.Select the interface for which you want Multicast Router to be enabled.

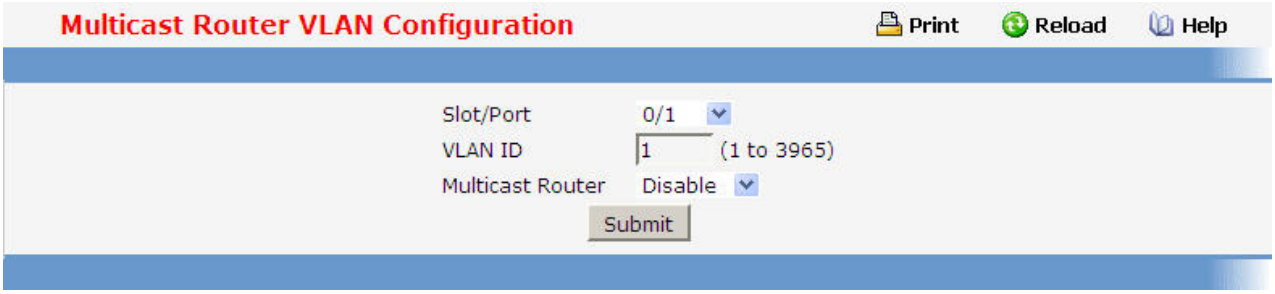
Configurable Data

VLAN ID - VLAN ID for which the Multicast Router Mode is to be Enabled or Disabled.

Multicast Router - For the Vlan ID, multicast router may be enabled or disabled using this.

Command Buttons

Submit - Update the switch with the values you entered.



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Configuring L2 Static Multicast Group Configuration Page

Non-Configurable Data

MAC Address Table - This is the list of MAC address and VLAN ID pairings for all configured L2Mcast Groups. To change the port mask(s) for an existing L2Mcast Group, select the entry you want to change. To add a new L2Mcast Group, select "Create Filter" from the top of the list.

Configurable Data

MAC Filter - The MAC address of the L2Mcast Group in the format 01:00:5E:xx:xx:xx. You can only change this field when you have selected the "**Create Filter**" option. You cannot define L2Mcast Group for these MAC addresses:

00:00:00:00:00:00

01:00:5E:00:00:01 to 01:00:5E:00:00:FF

FF:FF:FF:FF:FF:FF

VLAN ID - The VLAN ID used with the MAC address to fully identify packets you want L2Mcast Group. You can only change this field when you have selected the "Create Filter" option.

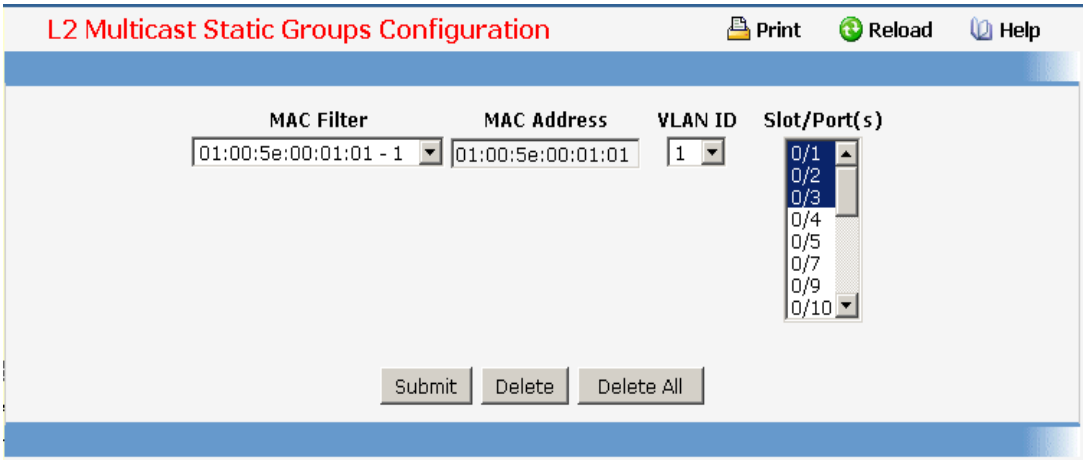
Solt/Port(s) - List the ports you want included into L2Mcast Group.

Command Buttons

Submit - Update the switch with the values on the screen. If you want the switch to retain the new values across a power cycle you must perform a save.

Delete - Remove the currently selected L2Mcast Group.

Delete All - Remove all configured L2Mcast Groups.



Viewing L2 Multicast Group Information Page

Use this panel to display information about entries in the L2Mcast Static/Dynamic Groups. These entries are used by the transparent bridging function to determine how to forward a received frame.

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Selection Criteria

Static - Displays static unit for L2Mcast Groups.

Dynamic - Displays dynamic unit for L2Mcast Groups.

All - Displays all of L2Mcast Groups.

Configurable Data

Filter - Specify the entries you want displayed.

Static: If you choose "Static" only L2Mcast addresses that have been configured will be displayed.

Dynamic: If you choose "Dynamic" only L2Mcast addresses that have been learned will be displayed.

All: If you choose "all" the whole table will be displayed.

MAC Address Search - You may also search for an individual L2Mcast address. Enter the six byte hexadecimal MAC address, for example 01:00:5E:00:11:11.

VLAN - You also have to give a VLAN ID you want with L2Mcast address.

Then click on the search button. If the address exists, that entry will be displayed as the first entry followed by the remaining (greater) MAC addresses. An exact match is required.

Non-Configurable Data

VLAN - L2Mcast Group's VLAN ID value.

MAC Address - A multicast MAC address for which the switch has forwarding information. The format is a six-byte MAC address. For example: 01:00:5E:00:11:11.

Slot/Ports - the interface number belongs to this Multicast Group.

Type - The status of this entry. The possible values are:

Static: the entry was configured by setting a static L2Mcast.

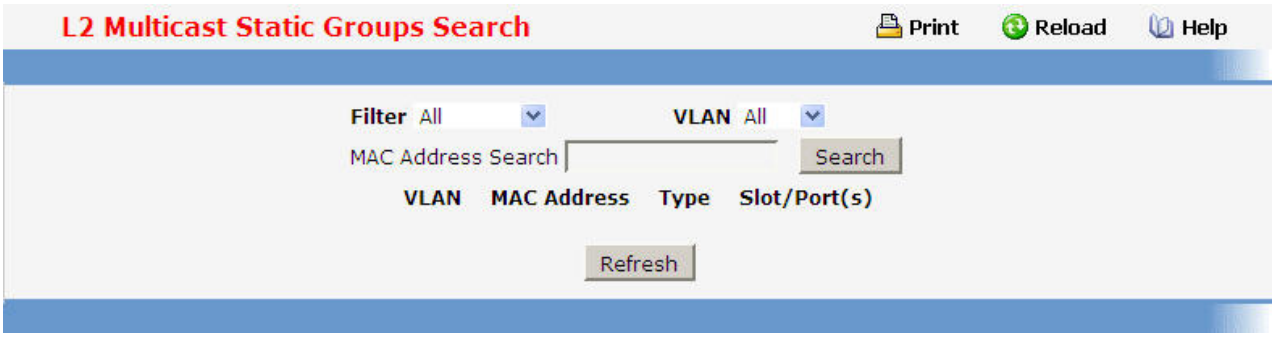
Dynamic: the entry was configured by setting a dynamic L2Mcast.

All: the entry was configured by setting the whole L2Mcast table.

Command Buttons

Search - Search for the specified L2Mcast address.

Refresh - Refresh the database and display it again starting with the first entry in the table.



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Viewing L2 Multicast Router Port Information Page

Use this panel to display information about entries in the L2Mcast Static/Dynamic router ports. These entries are used by the transparent bridging function to determine how to forward a received frame.

Selection Criteria

Static - Displays static unit for L2Mcast router port(s).

Dynamic - Displays dynamic unit for L2Mcast router port(s).

All - Displays all of L2Mcast router port(s).

Configurable Data

Filter - Specify the entries you want displayed.

Static: If you choose "Dynamic" only L2Mcast router port(s) that have been learned will be displayed.

Dynamic: If you choose "Static" only L2Mcast router port(s) that have been configured will be displayed.

All: If you choose "all" the whole table will be displayed.

VLAN - You also have to give a VLAN ID you want with L2Mcast router port.

If the entry exists, it will be displayed as the first entry followed by VLAN ID. An exact match is required.

Non-Configurable Data

VLAN - L2Mcast Router Port's VLAN ID value.

Slot/Ports - the interface number belongs to this Multicast router.

Type - The status of this entry. The possible values are:

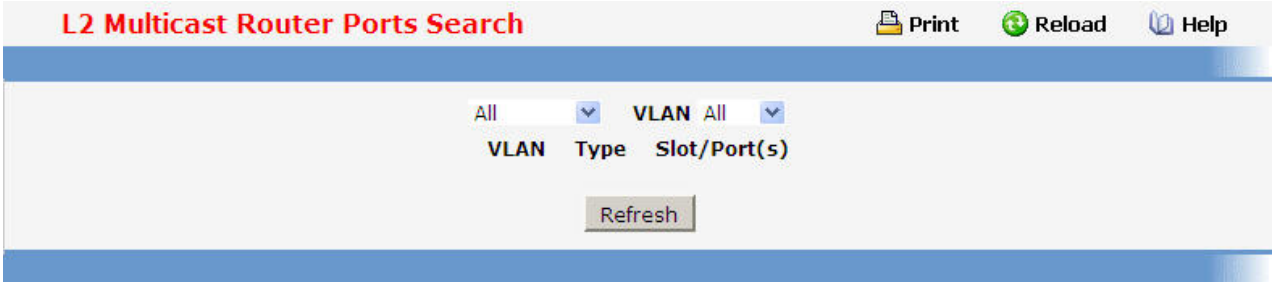
Static: the entry was configured by setting a static L2Mcast router.

Dynamic: the entry was configured by setting a dynamic L2Mcast router.

All: the entry was configured by setting the whole L2Mcast router table.

Command Buttons

Refresh - Refresh the database and display it again starting with the first entry in the table.



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8.2.2.5 **Managing Port-Channel**

Configuring Port-Channel Configuration Page

Selection Criteria

Port Channel Name – You can use this screen to reconfigure an existing Port Channel, or to create a new one. Use this pull down menu to select one of the existing Port Channels, or select 'Create' to add a new one. There can be a maximum of 6 Port Channels.

Configurable Data

Port Channel Name - Enter the name you want assigned to the Port Channel. You may enter any string of up to 15 alphanumeric characters. A valid name has to be specified in order to create the Port Channel.

Link Trap - Specify whether you want to have a trap sent when link status changes. The factory default is enable, which will cause the trap to be sent.

Administrative Mode - Select enable or disable from the pull down menu. When the Port Channel is disabled no traffic will flow and LACPDUs will be dropped, but the links that form the Port Channel will not be released. The factory default is enabled.

STP Mode - The Spanning Tree Protocol Administrative Mode associated with the Port Channel. The possible values are:

Disable - spanning tree is disabled for this Port Channel.

Enable - spanning tree is enabled for this Port Channel.

Participation - For each port specify whether it is to be included as a member of this Port Channel or not. The default is excluded. There can be a maximum of 8 ports assigned to a Port Channel.

Non-Configurable Data

Slot/Port - Slot/Port identification of the Port Channel being configured. This field will not appear when a new Port Channel is being created.

Link Status - Indicates whether the Link is up or down.

Port Channel Members - List of members of the Port Channel in Slot/Port form.

Membership Conflicts - Shows ports that are already members of other Port Channels. A port may only be a member of one Port Channel at a time. If the entry is blank, it is not currently a member of any Port Channel.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete - Removes the currently selected configured Port Channel. All ports that were members of this Port Channel are removed from the Port Channel and included in the default VLAN. This field will not appear when a new Port Channel is being created.

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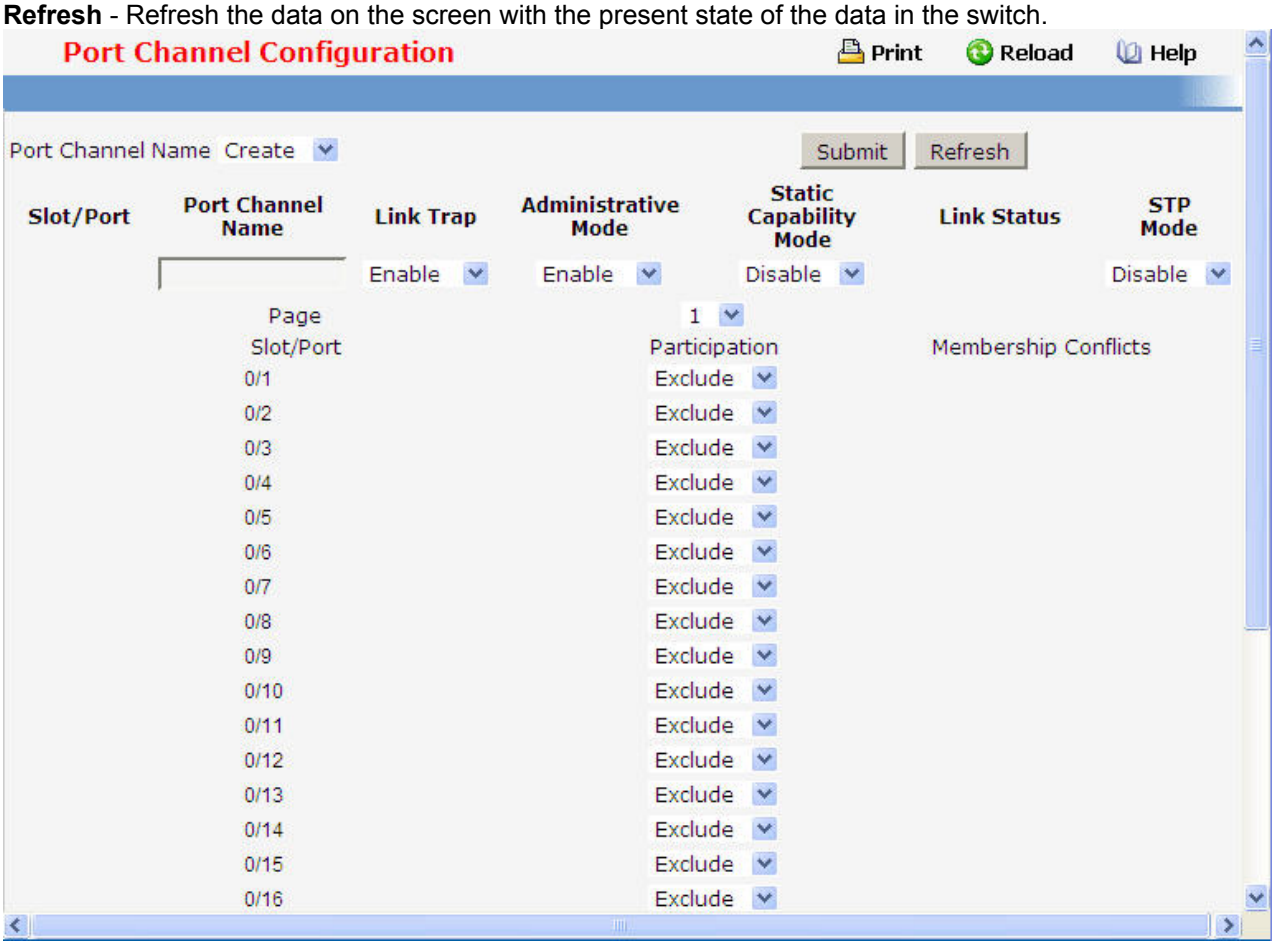
Refresh - Refresh the data on the screen with the present state of the data in the switch.



Viewing Port-Channel Information Page

Non-Configurable Data

Port Channel - The Slot/Port identification of the Port Channel.

Port Channel Name - The name of the Port Channel.

Port Channel Type - The type of this Port Channel.

Admin Mode - The Administrative Mode of the Port Channel, enable or disable.

Link Status - Indicates whether the Link is up or down.

STP Mode - The Spanning Tree Protocol Administrative Mode associated with the Port Channel. The possible values are:

Disable - spanning tree is disabled for this Port Channel.

Enable - spanning tree is enabled for this Port Channel.

Link Trap - Whether or not a trap will be sent when link status changes. The factory default is enabled.

Configured Ports - A list of the ports that are members of the Port Channel, in Slot/Port notation. There can be a maximum of 8 ports assigned to a Port Channel.

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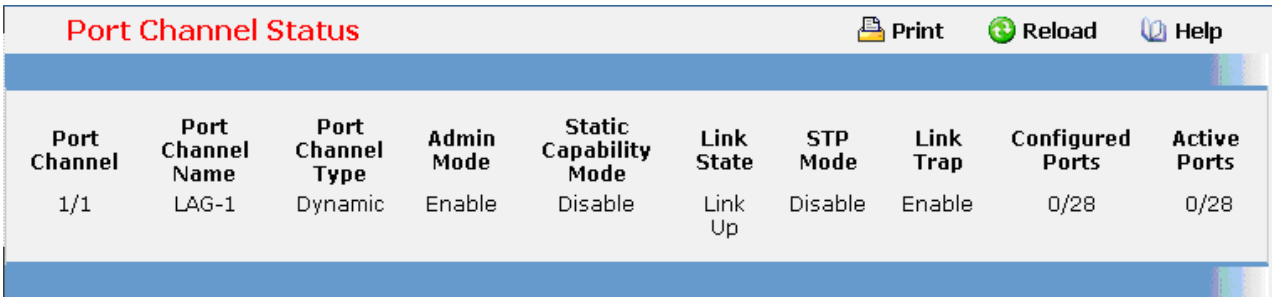
Active Ports - A listing of the ports that are actively participating members of this Port Channel, in Slot/Port notation. There can be a maximum of 8 ports assigned to a Port Channel.



8.2.2.6 **Viewing Multicast Forwarding Database**

Viewing All of Multicast Forwarding Database Tables Page

The Multicast Forwarding Database holds the port membership information for all active multicast address entries. The key for an entry consists of a VLAN ID and MAC address pair. Entries may contain data for more than one protocol.

Use this screen to display the MFDB information for a specific entry. To display all of the entries for a particular protocol use one of the following menus:

MAC Filter Summary - Static MAC address filtering entries

MFDB GMRP Table - GARP Multicast Registration Protocol entries

MFDB IGMP Snooping Table - IGMP Snooping entries

Selection Criteria

MAC Address - Enter the VLAN ID - MAC Address pair whose MFDB table entry you want displayed. Enter eight two-digit hexadecimal numbers separated by colons, for example 00:01:23:43:45:67:89:AB. The first two two-digit hexadecimal numbers are the VLAN ID and the remaining numbers are the MAC address. Then click on the "Search" button. If the address exists, that entry will be displayed. An exact match is required.

Non-Configurable Data

MAC Address - The multicast MAC address for which you requested data.

Type - This displays the type of the entry. Static entries are those that are configured by the end user. Dynamic entries are added to the table as a result of a learning process or protocol.

Component - This is the component that is responsible for this entry in the Multicast Forwarding Database. Possible values are IGMP Snooping, GMRP, and Static Filtering.

Description - The text description of this multicast table entry. Possible values are Management Configured, Network Configured, and Network Assisted.

Slot/Port(s) - The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:) for the selected address.

Forwarding Slot/Port(s) - The resultant forwarding list is derived from combining all the forwarding interfaces and removing the interfaces that are listed as the static filtering interfaces.

Command Buttons

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Refresh - Refresh the data on the screen with the present state of the data in the switch.

Viewing GMRP MFDB Table Page

This screen will display all of the entries in the Multicast Forwarding Database that were created for the GARP Multicast Registration Protocol.

Non-Configurable Data

MAC Address - A VLAN ID - multicast MAC address pair for which the switch has forwarding and/or filtering information. The format is 8 two-digit hexadecimal numbers that are separated by colons, for example 00:01:23:45:67:89:AB:CD.

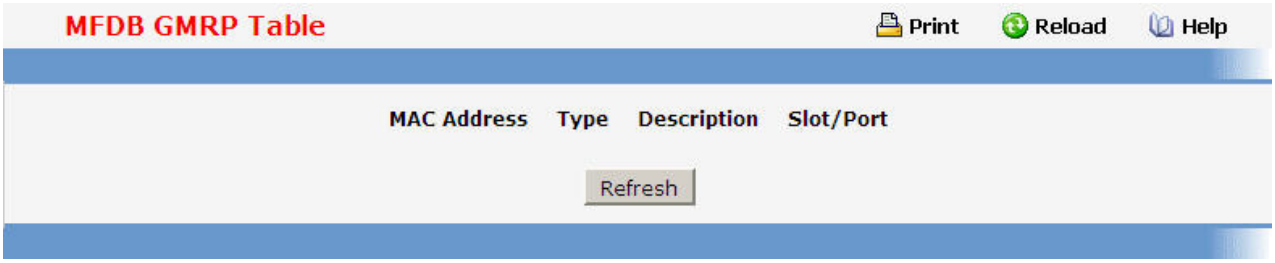
Type - This displays the type of the entry. Static entries are those that are configured by the user. Dynamic entries are added to the table as a result of a learning process or protocol.

Description - The text description of this multicast table entry. Possible values are Management Configured, Network Configured, and Network Assisted.

Slot/Port(s) - The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:).

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.



Viewing IGMP Snooping MFDB Table Page

Non-Configurable Data

MAC Address - A VLAN ID - multicast MAC address pair for which the switch has forwarding and/or filtering information. The format is 8 two-digit hexadecimal numbers that are separated by colons, for example 00:01:23:45:67:89:AB:CD.

Type - This displays the type of the entry. Static entries are those that are configured by the user. Dynamic entries are added to the table as a result of a learning process or protocol.

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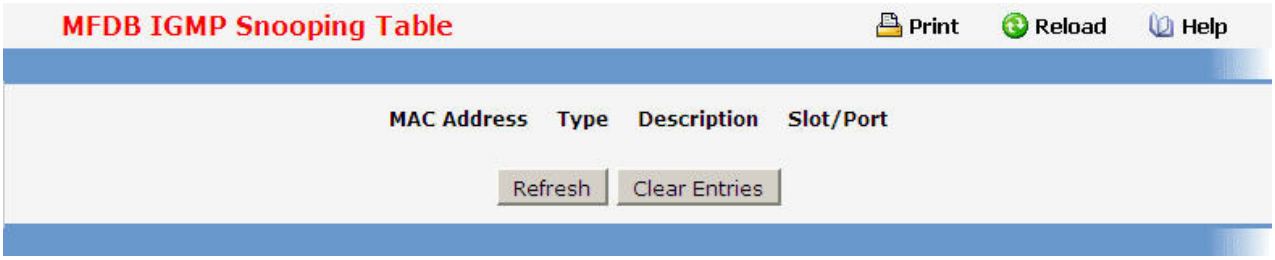
Description - The text description of this multicast table entry. Possible values are Management Configured, Network Configured, and Network Assisted.

Slot/Port(s) - The list of interfaces that are designated for forwarding (Fwd:) and filtering (Flt:).

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.

Clear Entries - Clicking this button tells the IGMP Snooping component to delete all of its entries from the multicast forwarding database.



Viewing Multicast Forwarding Database Statistics Page

Non-Configurable Data

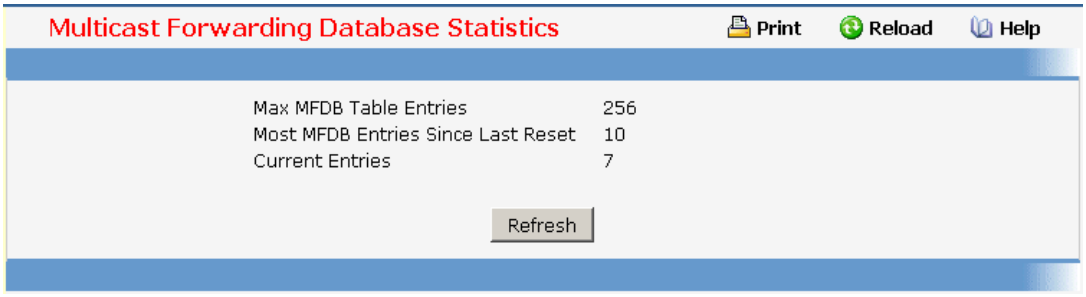
Max MFDB Entries - The maximum number of entries that the Multicast Forwarding Database table can hold.

Most MFDB Entries Since Last Reset - The largest number of entries that have been present in the Multicast Forwarding Database table since last reset. This value is also known as the MFDB high-water mark.

Current Entries - The current number of entries in the Multicast Forwarding Database table.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.



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8.2.2.7 **Managing Spanning Tree**

Configuring Switch Spanning Tree Configuration Page

Configurable Data

Spanning Tree Mode - Specifies whether spanning tree operation is enabled on the switch. Value is enabled or disabled

Force Protocol Version - Specifies the Force Protocol Version parameter for the switch. The options are IEEE 802.1d, IEEE 802.1w, and IEEE 802.1s The default value is IEEE 802.1w.

Configuration Name- Identifier used to identify the configuration currently being used. It may be up to 32 alphanumeric characters

Configuration Revision Level - Identifier used to identify the configuration currently being used. The values allowed are between 0 and 65535. The default value is 0.

Non-Configurable Data

Configuration digest key - Identifier used to identify the configuration currently being used.

MST Table - Table consisting of the MST instances (including the CST) and the corresponding VLAN IDs associated with each of them.

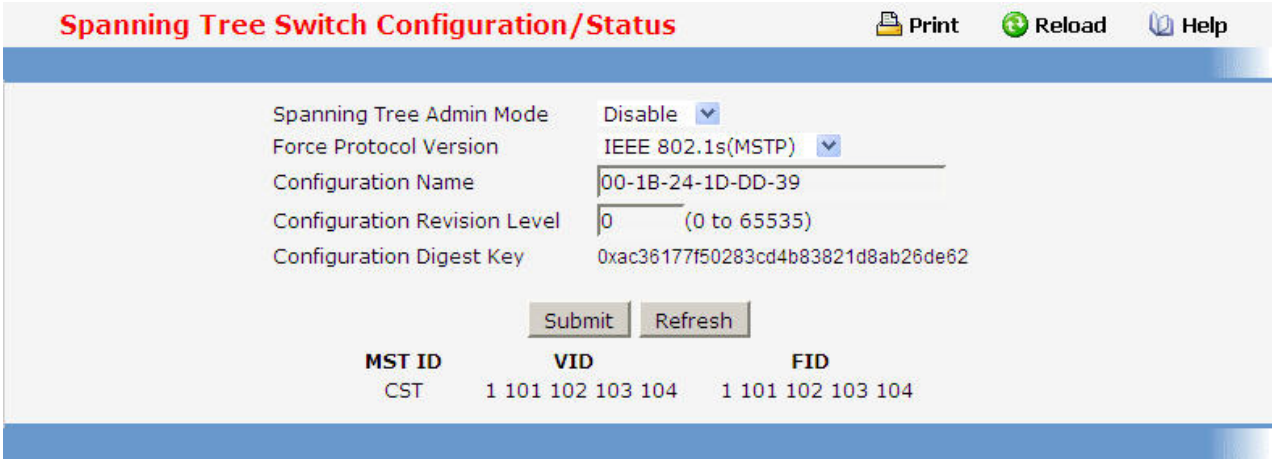
VID Table - Table consisting of the VLAN IDs and the corresponding FID associated with each of them.

FID Table - Table consisting of the FIDs and the corresponding VLAN IDs associated with each of them.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

Refresh - Refreshes the screen with most recent data.



Configuring Spanning Tree CST Configuration Page

Configurable Data

Bridge Priority - Specifies the bridge priority for the Common and Internal Spanning tree (CST). The value lies between 0 and 61440. It is set in multiples of 4096. For example, if you set the priority to any value between 0 and 4095, it will be set to 0. If it is tried to be set to any value between 4096 and (2*4096-1) it will be set to 4096 and so on. The default priority is 32768.

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Bridge Max Age - Specifies the bridge max age for the Common and Internal Spanning tree (CST). The value lies between 6 and 40, with the value being less than or equal to "2 * (Bridge Forward Delay - 1)" and greater than or equal to "2 * (Bridge Hello Time + 1)". The default value is 20.

Bridge Hello Time - Specifies the bridge hello time for the Common and Internal Spanning tree (CST), with the value being less than or equal to "(Bridge Max Age / 2) - 1". The default hello time value is 2.

Bridge Forward Delay- Specifies the time spent in "Listening and Learning" mode before forwarding packets. Bridge Forward Delay must be greater or equal to "(Bridge Max Age / 2) + 1". The time range is from 4 seconds to 30 seconds. The default value is 15.

Spanning Tree Maximum Hops- Configure the maximum number of hops for the Spanning tree.

Non-Configurable Data

Bridge identifier - The bridge identifier for the CST. It is made up using the bridge priority and the base MAC address of the bridge.

Time since topology change - The time in seconds since the topology of the CST last changed.

Topology change count - Number of times topology has changed for the CST.

Topology change - The value of the topology change parameter for the switch indicating if a topology change is in progress on any port assigned to the CST. It takes a value if True or False.

Designated root - The bridge identifier of the root bridge. It is made up from the bridge priority and the base MAC address of the bridge.

Root Path Cost - Path Cost to the Designated Root for the CST.

Root Port - Port to access the Designated Root for the CST.

Max Age - Path Cost to the Designated Root for the CST.

Forward Delay - Derived value of the Root Port Bridge Forward Delay parameter.

Hold Time - Minimum time between transmission of Configuration BPDUs.

CST Regional Root - Priority and base MAC address of the CST Regional Root.

CST Path Cost - Path Cost to the CST tree Regional Root.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

Refresh - Refreshes the screen with most recent data.

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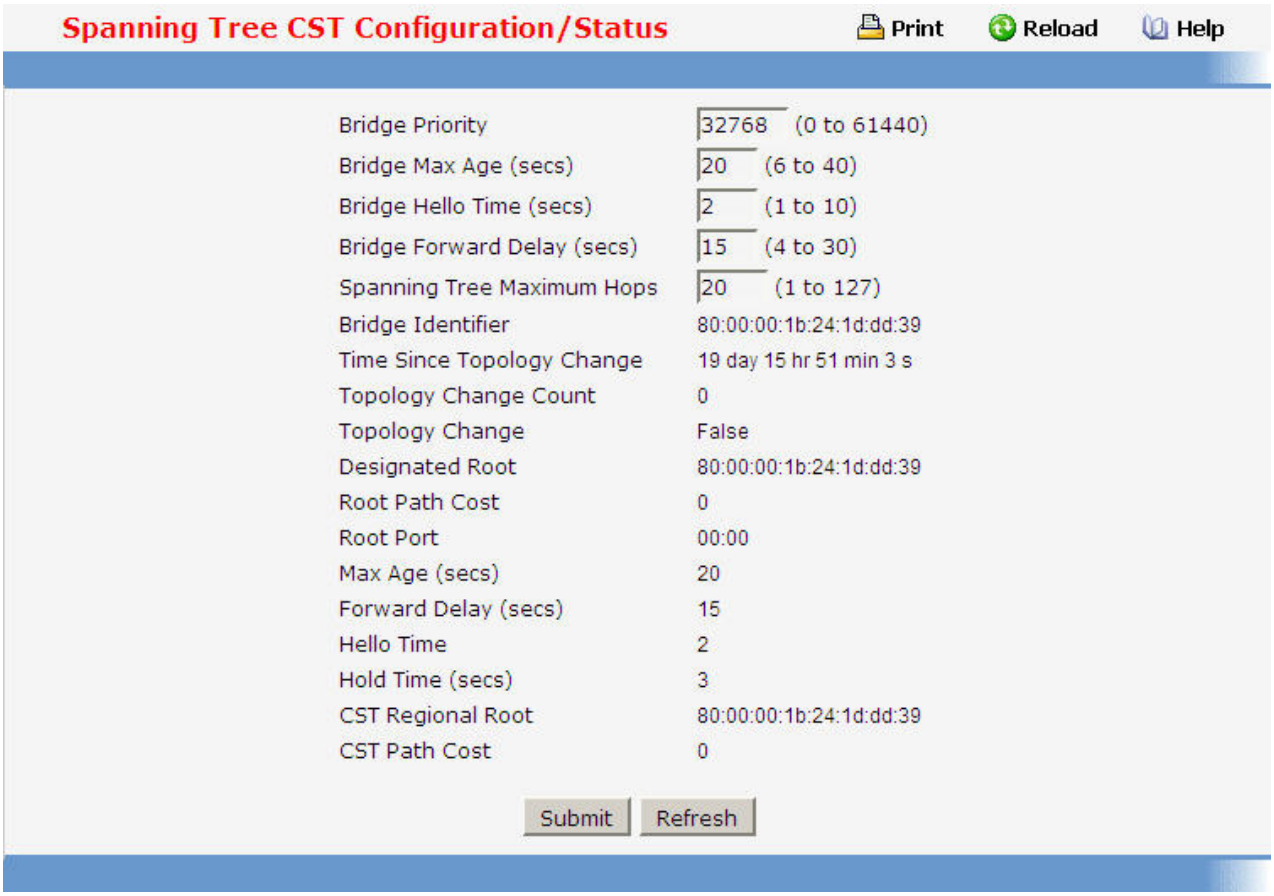

Configuring Spanning Tree MST Configuration Page

Selection Criteria

MST ID - Create a new MST which you wish to configure or configure already existing MSTs.

Configurable Data

MST ID - This is only visible when the select option of the MST ID select box is selected. The ID of the MST being created. Valid values for this are between 1 and 4054.

Priority - The bridge priority for the MST instance selected. The bridge priority is set in multiples of 4096. For example if you attempt to set the priority to any value between 0 and 4095, it will be set to 0. If you attempt to set any value between 4096 and (2*4096-1) it will be set to 4096 and so on.

VLAN ID - This gives a list box of all VLANs on the switch. The VLANs associated with the MST instance which is selected are highlighted on the list. These can be selected or unselected for re-configuring the association of VLANs to MST instances.

Non-Configurable Data

Bridge identifier - The bridge identifier for the selected MST instance. It is made up using the bridge priority and the base MAC address of the bridge.

Time since topology change - The time in seconds since the topology of the selected MST instance last changed.

Topology change count - Number of times the topology has changed for the selected MST instance.

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Topology change - The value of the topology change parameter for the switch indicating if a topology change is in progress on any port assigned to the selected MST instance. It takes a value if True or False.

Designated root - The bridge identifier of the root bridge. It is made up from the bridge priority and the base MAC address of the bridge

Root Path Cost - Path Cost to the Designated Root for this MST instance.

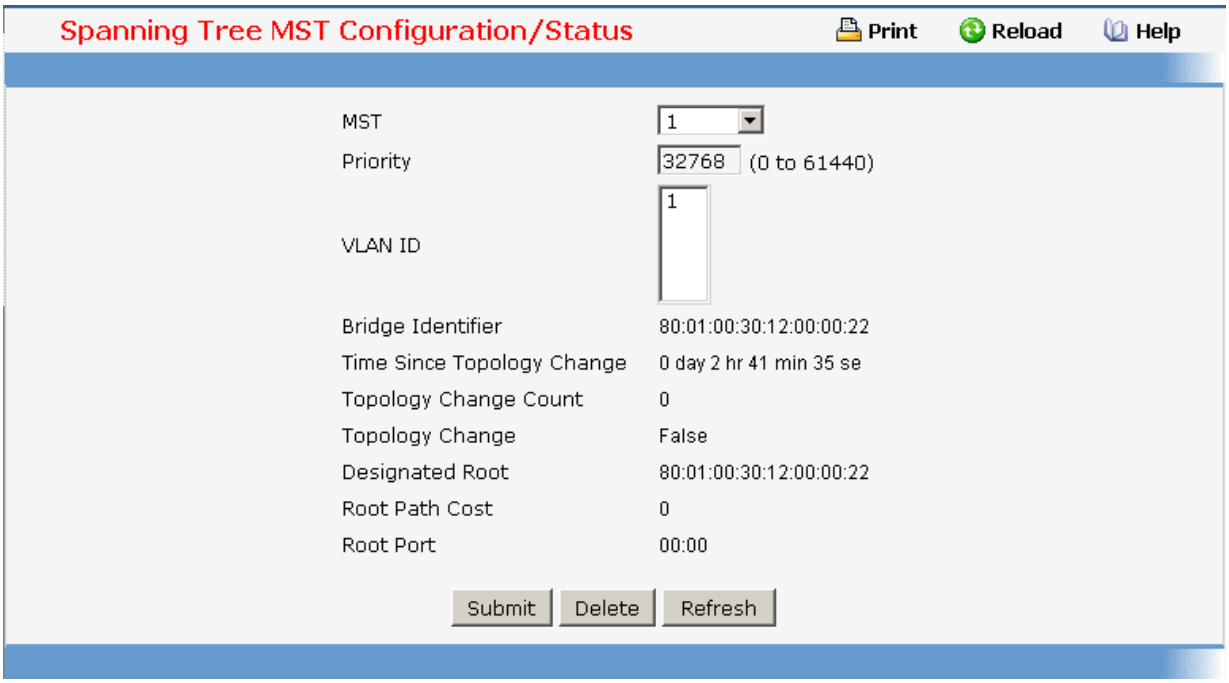
Root port - Port to access the Designated Root for this MST instance.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

Delete - Deletes the selected MST instance. All VLANs associated with the instance are associated with the CST

Refresh - Refreshes the screen with most recent data.



Configuring each Port CST Configuration Page

Selection Criteria

Slot/Port - Selects one of the physical or LAG interfaces associated with VLANs associated with the CST.

Configurable Data

Port Priority - The priority for a particular port within the CST. The port priority is set in multiples of 16. For example, if you attempt to set the priority to any value between 0 and 15, it will be set to 0. If you attempt to set any value between 16 and (2*16-1) it will be set to 16 and so on.

Admin Edge Port - Specifies if the specified port is an Edge Port within the CIST. It takes a value of Enable or Disable, where the default value is Disable.

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Port Path Cost - Set the Path Cost to a new value for the specified port in the common and internal spanning tree. It takes a value in the range of 1 to 200000000.

Non-Configurable Data

Auto-calculate Port Path Cost - Displays whether the path cost is automatically calculated (Enabled) or not (Disabled). Path cost will be calculated based on the link speed of the port if the configured value for Port Path Cost is zero.

Port ID - The port identifier for the specified port within the CST. It is made up from the port priority and the interface number of the port.

Port Up Time Since Counters Last Cleared - Time since the counters were last cleared, displayed in Days, Hours, Minutes, and Seconds.

Port Mode - Spanning Tree Protocol Administrative Mode associated with the port or LAG. The possible values are Enable or Disable.

Port Forwarding State - The Forwarding State of this port.

Port Role - Each MST Bridge Port that is enabled is assigned a Port Role for each spanning tree. The port role will be one of the following values: Root Port, Designated Port, Alternate Port, Backup Port, Master Port, or Disabled Port.

Designated Root - Root Bridge for the CST. It is made up using the bridge priority and the base MAC address of the bridge.

Designated Cost - Path Cost offered to the LAN by the Designated Port.

Designated Bridge - Bridge Identifier of the bridge with the Designated Port. It is made up using the bridge priority and the base MAC address of the bridge.

Designated Port - Port Identifier on the Designated Bridge that offers the lowest cost to the LAN. It is made up from the port priority and the interface number of the port.

Topology Change Acknowledge - Identifies whether the next BPDU to be transmitted for this port would have the topology change acknowledgement flag set. It is either "True" or "False".

Edge port - indicates whether the port is enabled as an edge port. It takes the value "Enabled" or "Disabled".

Point-to-point MAC - Derived value of the point-to-point status.

CST Regional Root - Bridge Identifier of the CST Regional Root. It is made up using the bridge priority and the base MAC address of the bridge.

CST Path Cost - Path Cost to the CST Regional Root.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

Refresh - Refreshes the screen with most recent data.

Force - Clicking this button will force the port to send out 802.1w or 802.1s BPDUs.

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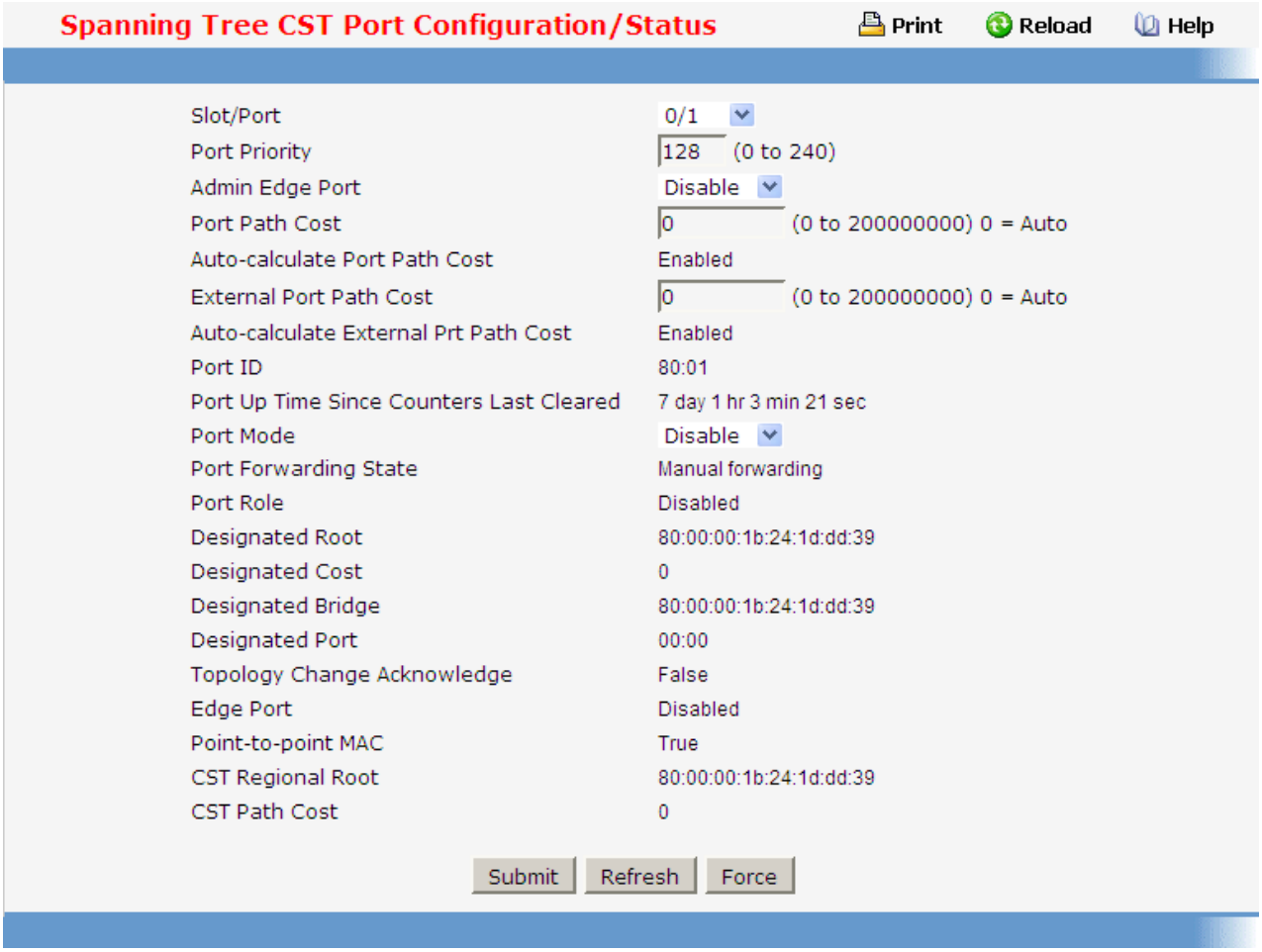

Configuring each Port MST Configuration Page

Selection Criteria

MST ID - Selects one MST instance from existing MST instances.

Slot/Port - Selects one of the physical or LAG interfaces associated with VLANs associated with the selected MST instance.

Configurable Data

Port Priority - The priority for a particular port within the selected MST instance. The port priority is set in multiples of 16. For example, if you set the priority to any value between 0 and 15, it will be set to 0. If it is tried to be set to any value between 16 and (2*16-1) it will be set to 16 and so on.

Port Path Cost - Set the Path Cost to a new value for the specified port in the selected MST instance. It takes a value in the range of 1 to 200000000.

Non-Configurable Data

Auto-calculate Port Path Cost - Displays whether the path cost is automatically calculated (Enabled) or not (Disabled). Path cost will be calculated based on the link speed of the port if the configured value for Port Path Cost is zero.

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Port ID - The port identifier for the specified port within the selected MST instance. It is made up from the port priority and the interface number of the port.

Port Up Time Since Counters Last Cleared - Time since the counters were last cleared, displayed in Days, Hours, Minutes, and Seconds.

Port Mode - Spanning Tree Protocol Administrative Mode associated with the port or LAG. The possible values are Enable or Disable.

Port Forwarding State - The Forwarding State of this port.

Port Role - Each MST Bridge Port that is enabled is assigned a Port Role for each spanning tree. The port role will be one of the following values: Root Port, Designated Port, Alternate Port, Backup Port, Master Port, or Disabled Port.

Designated Root - Root Bridge for the selected MST instance. It is made up using the bridge priority and the base MAC address of the bridge.

Designated Cost - Path Cost offered to the LAN by the Designated Port.

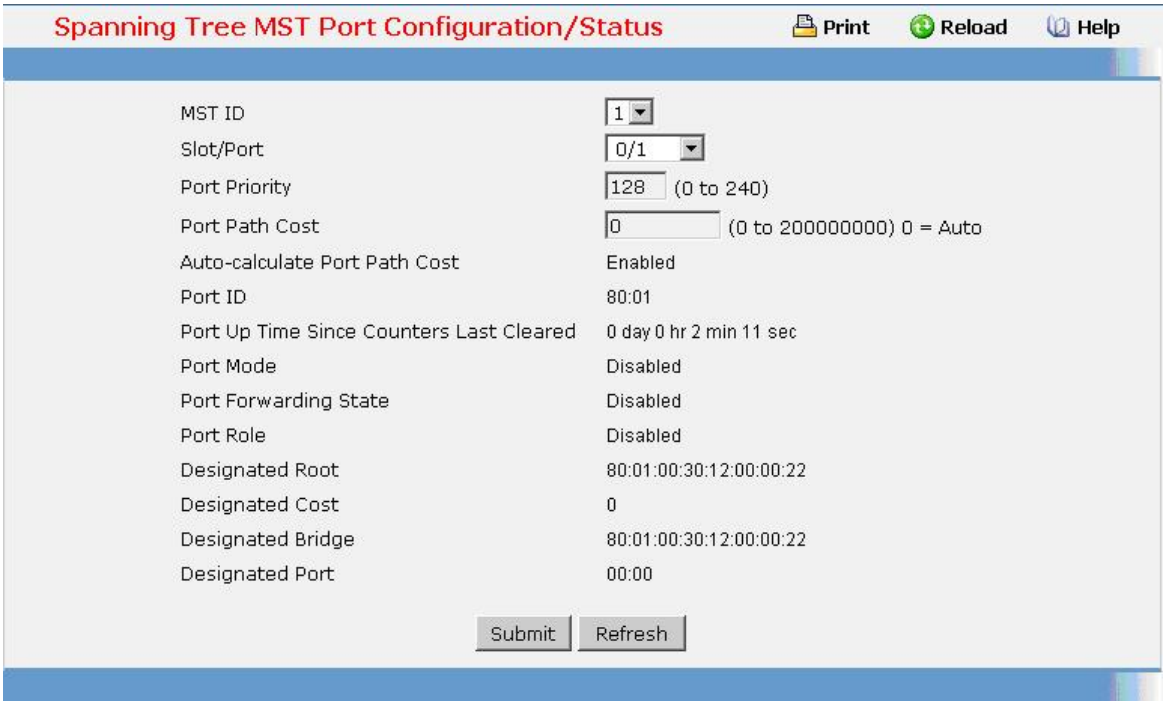
Designated Bridge - Bridge Identifier of the bridge with the Designated Port. It is made up using the bridge priority and the base MAC address of the bridge.

Designated Port - Port Identifier on the Designated Bridge that offers the lowest cost to the LAN. It is made up from the port priority and the interface number of the port.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

Refresh - Refreshes the screen with most recent data.



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Viewing Spanning Tree Statistics Page

Selection Criteria

Slot/Port - Selects one of the physical or LAG interfaces of the switch.

Non-Configurable Data

STP BPDUs Received - Number of STP BPDUs received at the selected port.

STP BPDUs Transmitted - Number of STP BPDUs transmitted from the selected port.

RSTP BPDUs Received - Number of RSTP BPDUs received at the selected port.

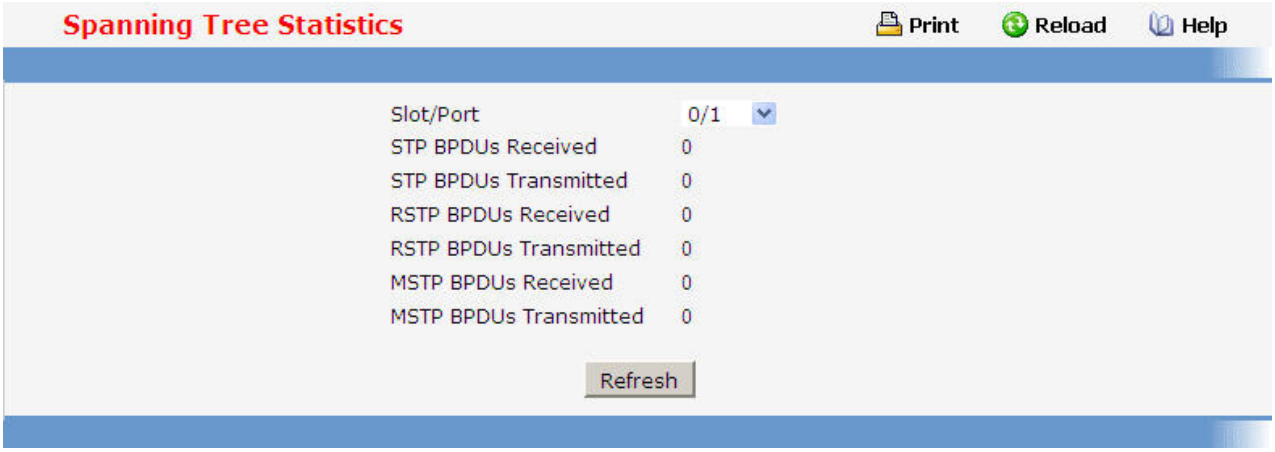
RSTP BPDUs Transmitted - Number of RSTP BPDUs transmitted from the selected port.

MSTP BPDUs Received - Number of MSTP BPDUs received at the selected port.

MSTP BPDUs Transmitted - Number of MSTP BPDUs transmitted from the selected port.

Command Buttons

Refresh - Refreshes the screen with most recent data.



8.2.2.8 **Defining 802.1p priority**

Defining 802.1p Priority Mapping Page

Selection Criteria

Slot/Port - Select the physical interface for which you want to display or configure data. Select 'All' to set the parameters for all ports to the same values.

Configurable Data

Traffic Class - Specify which internal traffic class to map the corresponding 802.1p priority.

Non-Configurable Data

802.1p Priority - Displays the 802.1p priority to be mapped.

Command Buttons

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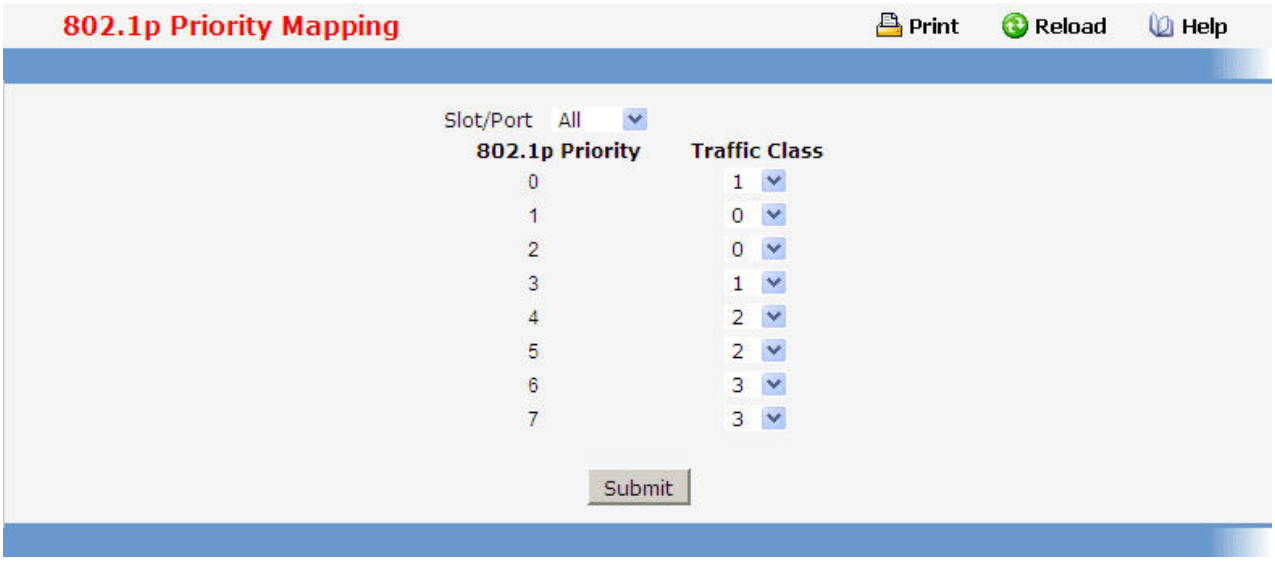
Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.



8.2.2.9 **Managing Port Security**

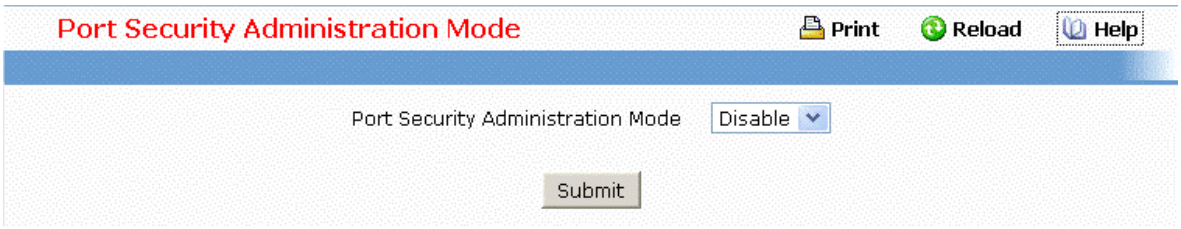
Configuring Port Security Administration Mode Page

Configurable Data

Allow Port Security - Used to enable or disable the Port Security feature.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.



Configuring Port Security Interface Page

Selection Criteria

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Slot/Port - Selects the interface to be configured.

Configurable Data

Allow Port Security - Used to enable or disable the Port Security feature for the selected interface.

Maximum Dynamic MAC Addresses allowed - Sets the maximum number of dynamically locked MAC addresses on the selected interface.

Add a static MAC address- Adds a MAC address to the list of statically locked MAC addresses for the selected interface.

VLAN ID- Adds a corresponding VLAN ID for the MAC Address being added to the list of statically locked MAC addresses for the selected interface.

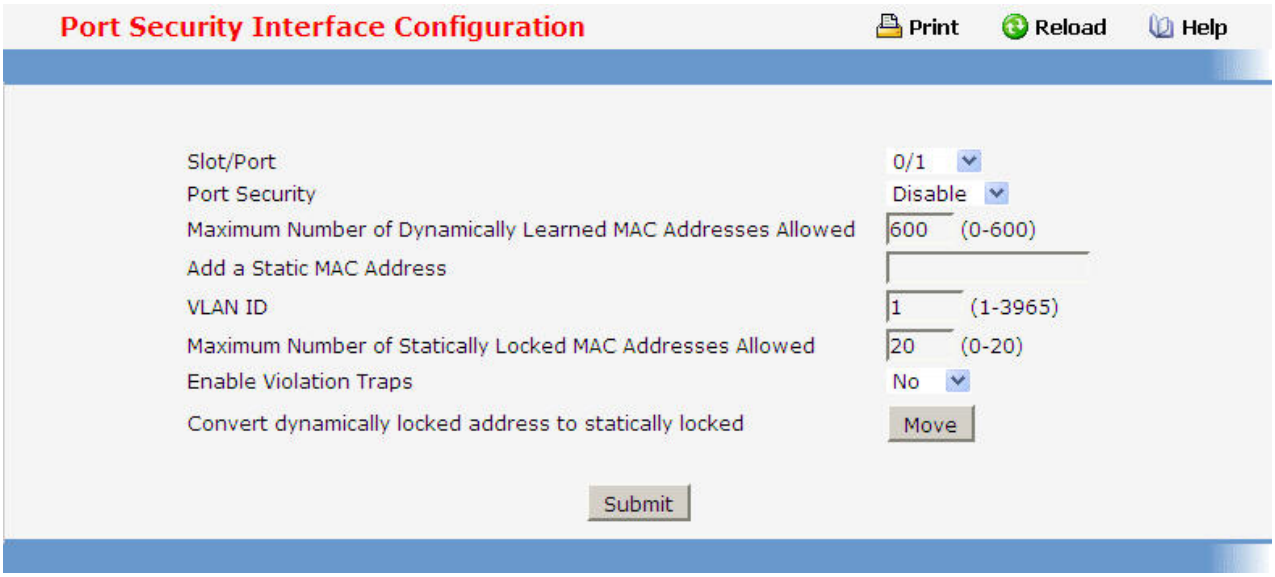
Maximum static MAC Addresses allowed- Sets the maximum number of dynamically locked MAC addresses on the selected interface.

Enable violation traps- Enables or disables the sending of new violation traps designating when a packet with a disallowed MAC address is received on a locked port.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

Move - Convert a dynamically locked MAC address to a statically locked address. The Dynamic MAC address entries are converted to Static MAC address entries in a numerically ascending order till the Static limit is reached.



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Deleting Port Security Statically Configured MAC Address Page

Selection Criteria

Slot/Port - Select the physical interface for which you want to display data.

VLAN ID - selects the VLAN ID corresponding to the MAC address being deleted.

Configurable data

MAC Address - Accepts user input for the MAC address to be deleted.

Non-configurable data

MAC Address - Displays the user specified statically locked MAC address.

VLAN ID - Displays the VLAN ID corresponding to the MAC address.

Delete a Static MAC Address - Deletes the MAC address from the Port-Security Static MAC address table.

VLAN ID - Displays the VLAN ID corresponding to the MAC address to be deleted from the Static list.

Command Buttons

Submit - Applies the new configuration and causes the changes to take effect. These changes will not be retained across a power cycle unless a save configuration is performed.

Viewing Port Security Dynamically Learnt MAC Address Page

Selection Criteria

Slot/Port - Select the physical interface for which you want to display data.

Non-configurable data

MAC Address - Displays the MAC addresses learned on a specific port.

VLAN ID - Displays the VLAN ID corresponding to the MAC address.

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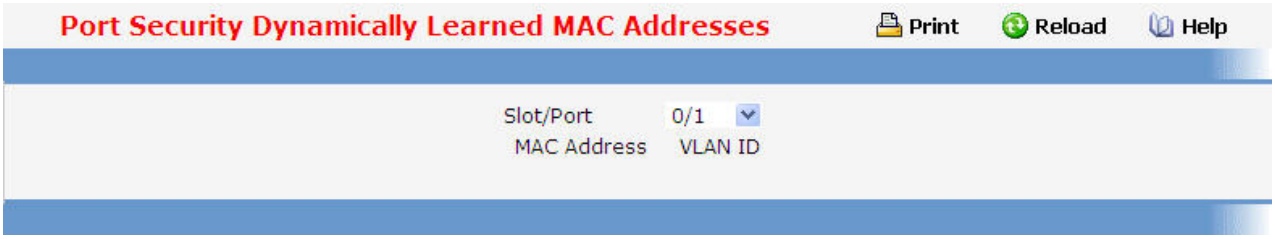
Number of Dynamic MAC addresses learned - Displays the number of dynamically learned MAC addresses on a specific port.



Viewing Port Security Violation Status Page

Selection Criteria

Slot/Port - Select the physical interface for which you want to display data.

Non-configurable data

Last Violation MAC Address - Displays the source MAC address of the last packet that was discarded at a locked port.

VLAN ID - Displays the VLAN ID corresponding to the Last Violation MAC address.

8.2.3 *Routing Menu*

8.2.3.1 **Managing ARP Table**

Creating ARP entries

Use this panel to add an entry to the Address Resolution Protocol table.

Configurable Data

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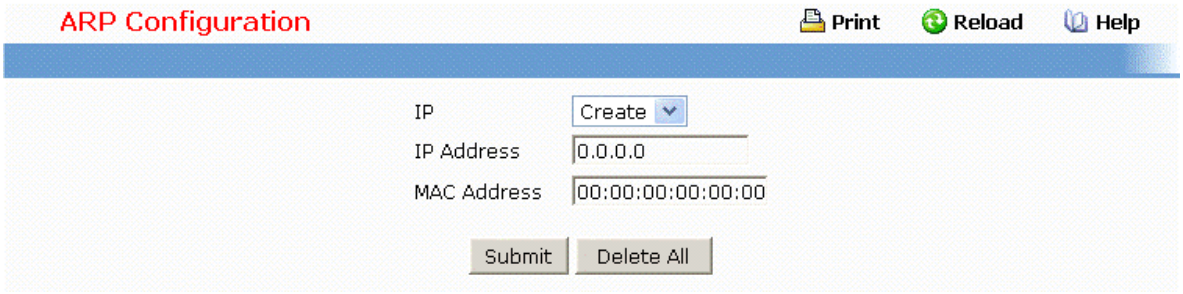
IP - Specifies all the existing static ARP along with an additional option "Create". When the user selects "Create" another text boxes " IP Address" and "MAC Address" appear where the user may enter IP address and MAC address to be configured.

IP Address - Enter the IP address you want to add. It must be the IP address of a device on a subnet attached to one of the switch's existing routing interfaces.

MAC Address - The unicast MAC address of the device. Enter the address as six two-digit hexadecimal numbers separated by colons, for example 00:06:29:32:81:40.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.



Configuring ARP Table

You can use this panel to change the configuration parameters for the Address Resolution Protocol Table. You can also use this screen to display the contents of the table.

Configurable Data

Age Time - Enter the value you want the switch to use for the ARP entry ageout time. You must enter a valid integer, which represents the number of seconds it will take for an ARP entry to age out. The range for this field is 15 to 21600 seconds. The default value for Age Time is 1200 seconds.

Response Time - Enter the value you want the switch to use for the ARP response timeout. You must enter a valid integer, which represents the number of seconds the switch will wait for a response to an ARP request. The range for this field is 1 to 10 seconds. The default value for Response Time is 1 second.

Retries - Enter an integer which specifies the maximum number of times an ARP request will be retried. The range for this field is 0 to 10. The default value for Retries is 4.

Cache Size - Enter an integer which specifies the maximum number of entries for the ARP cache. The range for this field is 256 to 3200. The default value for Cache Size is 3200.

Dynamic Renew - This controls whether the ARP component automatically attempts to renew ARP Entries of type Dynamic when they age out. The default setting is Enable.

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Remove from Table - Allows the user to remove certain entries from the ARP Table. The choices listed specify the type of ARP Entry to be deleted:

- ***All Dynamic Entries***
- ***All Dynamic and Gateway Entries***
- ***Specific Dynamic/Gateway Entry*** - Selecting this allows the user to specify the required IP Address
- ***Specific Static Entry*** - Selecting this allows the user to specify the required IP Address
- ***Specific Interface*** - Selecting this allows the user to specify the required interface
- ***None*** - Selected if the user does not want to delete any entry from the ARP Table

Remove IP Address - This appears only if the user selects Specific Dynamic/Gateway Entry or Specific Static Entry in the Remove from Table Drop Down List. Allows the user to enter the IP Address against the entry that is to be removed from the ARP Table.

Slot/Port - The routing interface associated with the ARP entry.

Non-Configurable Data

Total Entry Count - Total number of Entries in the ARP table.

Peak Total Entries - Highest value reached by Total Entry Count. This counter value is restarted whenever the ARP table Cache Size value is changed.

Active Static Entries - Total number of Active Static Entries in the ARP table.

Configured Static Entries - Total number of Configured Static Entries in the ARP table.

Maximum Static Entries - Maximum number of Static Entries that can be defined.

IP Address - The IP address of a device on a subnet attached to one of the switch's routing interfaces.

MAC Address - The unicast MAC address for the device. The format is six two-digit hexadecimal numbers separated by colons, for example 00:06:29:32:81:40.

Slot/Port - The routing interface associated with the ARP entry.

Type - The type of the ARP entry:

- **Local** - An ARP entry associated with one of the switch's routing interface's MAC addresses
- **Gateway** - A dynamic ARP entry whose IP address is that of a router
- **Static** - An ARP entry configured by the user
- **Dynamic** - An ARP entry which has been learned by the router

Age - Age since the entry was last refreshed in the ARP Table. The format is hh:mm:ss.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

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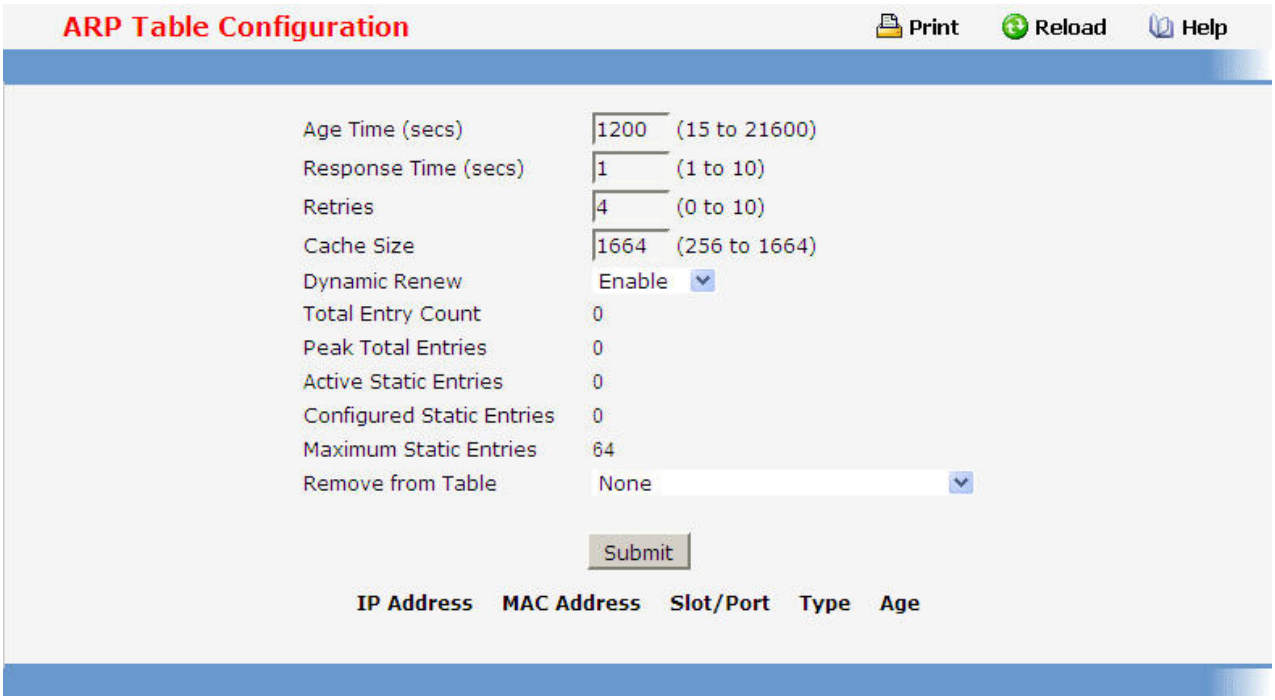

8.2.3.2 **Managing IP Interfaces**

Configuring IP

Use this menu to configure routing parameters for the switch as opposed to an interface.

Configurable Data

Routing Mode - Select enable or disable from the pulldown menu. You must enable routing for the switch before you can route through any of the interfaces. The default value is disable.

IP Forwarding Mode - Select enable or disable from the pulldown menu. This enables or disables the forwarding of IP frames. The default value is enable.

Non-Configurable Data

Default Time to Live - The default value inserted into the Time-To-Live field of the IP header of datagrams originated by the switch, if a TTL value is not supplied by the transport layer protocol.

Maximum Next Hops - The maximum number of hops supported by the switch. This is a compile-time constant.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

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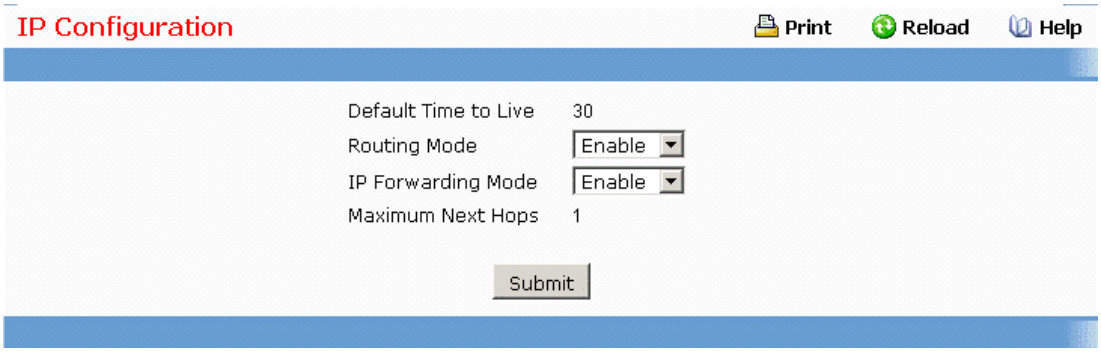

Viewing IP Statistics

The statistics reported on this panel are as specified in RFC 1213.

Non-Configurable Data

IpInReceives - The total number of input datagrams received from interfaces, including those received in error.

IpInHdrErrors - The number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options, etc.

IpInAddrErrors - The number of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., 0.0.0.0) and addresses of unsupported Classes (e.g., Class E). For entities which are not IP Gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

IpForwDatagrams - The number of input datagrams for which this entity was not their final IP destination, as a result of which an attempt was made to find a route to forward them to that final destination. In entities which do not act as IP Gateways, this counter will include only those packets which were Source-Routed via this entity, and the Source-Route option processing was successful.

IpInUnknownProtos - The number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

IpInDiscards - The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (e.g., for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly.

IpInDelivers - The total number of input datagrams successfully delivered to IP user-protocols (including ICMP).

IpOutRequests - The total number of IP datagrams which local IP user-protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in ipForwDatagrams.

IpOutDiscards - The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (e.g., for lack of buffer space). Note

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that this counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.

IpNoRoutes - The number of IP datagrams discarded because no route could be found to transmit them to their destination. Note that this counter includes any packets counted in ipForwDatagrams which meet this `no-route' criterion. Note that this includes any datagrams which a host cannot route because all of its default gateways are down.

IpReasmTimeout - The maximum number of seconds which received fragments are held while they are awaiting reassembly at this entity.

IpReasmReqds - The number of IP fragments received which needed to be reassembled at this entity.

IpReasmOKs - The number of IP datagrams successfully re-assembled.

IpReasmFails - The number of failures detected by the IP re-assembly algorithm (for whatever reason: timed out, errors, etc). Note that this is not necessarily a count of discarded IP fragments since some algorithms can lose track of the number of fragments by combining them as they are received.

IpFragOKs - The number of IP datagrams that have been successfully fragmented at this entity.

IpFragFails - The number of IP datagrams that have been discarded because they needed to be fragmented at this entity but could not be, e.g., because their Don't Fragment flag was set.

IpFragCreates - The number of IP datagram fragments that have been generated as a result of fragmentation at this entity.

IpRoutingDiscards - The number of routing entries which were chosen to be discarded even though they are valid. One possible reason for discarding such an entry could be to free-up buffer space for other routing entries.

IcmpInMsgs - The total number of ICMP messages which the entity received. Note that this counter includes all those counted by icmpInErrors.

IcmpInErrors - The number of ICMP messages which the entity received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, etc.).

IcmpInDestUnreachs - The number of ICMP Destination Unreachable messages received.

IcmpInTimeExcds - The number of ICMP Time Exceeded messages received.

IcmpInParmProbs - The number of ICMP Parameter Problem messages received.

IcmpInSrcQuenchs - The number of ICMP Source Quench messages received.

IcmpInRedirects - The number of ICMP Redirect messages received.

IcmpInEchos - The number of ICMP Echo (request) messages received.

IcmpInEchoReps - The number of ICMP Echo Reply messages received.

IcmpInTimestamps - The number of ICMP Timestamp (request) messages received.

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IcmpInTimestampReps - The number of ICMP Timestamp Reply messages received.

IcmpInAddrMasks - The number of ICMP Address Mask Request messages received.

IcmpInAddrMaskReps - The number of ICMP Address Mask Reply messages received.

IcmpOutMsgs - The total number of ICMP messages which this entity attempted to send. Note that this counter includes all those counted by icmpOutErrors.

IcmpOutErrors - The number of ICMP messages which this entity did not send due to problems discovered within ICMP such as a lack of buffers. This value should not include errors discovered outside the ICMP layer such as the inability of IP to route the resultant datagram. In some implementations there may be no types of error which contribute to this counter's value.

IcmpOutDestUnreachs - The number of ICMP Destination Unreachable messages sent.

IcmpOutTimeExcds - The number of ICMP Time Exceeded messages sent.

IcmpOutParmProbs - The number of ICMP Parameter Problem messages sent.

IcmpOutSrcQuenchs - The number of ICMP Source Quench messages sent.

IcmpOutRedirects - The number of ICMP Redirect messages sent. For a host, this object will always be zero, since hosts do not send redirects.

IcmpOutEchos - The number of ICMP Echo (request) messages sent.

IcmpOutEchoReps - The number of ICMP Echo Reply messages sent.

IcmpOutTimestamps - The number of ICMP Timestamp (request) messages.

IcmpOutTimestampReps - The number of ICMP Timestamp Reply messages sent.

IcmpOutAddrMasks - The number of ICMP Address Mask Request messages sent.

IcmpOutAddrMaskReps - The number of ICMP Address Mask Reply messages sent.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.

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Configuring IP Interfaces

Selection Criteria

Slot/Port - Select the interface for which data is to be displayed or configured.

Configurable Data

IP Address - Enter the IP address for the interface.

Subnet Mask - Enter the subnet mask for the interface. This is also referred to as the subnet/network mask, and defines the portion of the interface's IP address that is used to identify the attached network.

Routing Mode - Setting this enables or disables routing for an interface. The default value is enable.

Administrative Mode - The Administrative Mode of the interface. The default value is enable.

Forward Net Directed Broadcasts - Select how network directed broadcast packets should be handled. If you select enable from the pulldown menu network directed broadcasts will be forwarded. If you select disable they will be dropped. The default value is disable.

Encapsulation Type - Select the link layer encapsulation type for packets transmitted from the specified interface from the pulldown menu. The possible values are Ethernet and SNAP. The default is Ethernet.

Proxy Arp - Select to disable or enable proxy Arp for the specified interface from the pulldown menu.

IP MTU - Specifies the maximum transmission unit (MTU) size of IP packets sent on an interface. Valid range is (68 to 1500). Default value is 1500.

Non-Configurable Data

Active State - The state of the specified interface is either Active or Inactive. An interface is considered active if it the link is up and it is in forwarding state.

MAC Address - The burned-in physical address of the specified interface. The format is six two-digit hexadecimal numbers separated by colons, for example 00:06:29:32:81:40.

Command Buttons

Submit - Update the switch with the values on this screen. If you want the switch to retain the new values across a power cycle, you must perform a save.

Delete IP Address - Delete the IP Address from the interface. Note that the address can not be deleted if there are secondary addresses configured.

Secondary IP Address - Proceed to the Secondary IP Address configuration screen.

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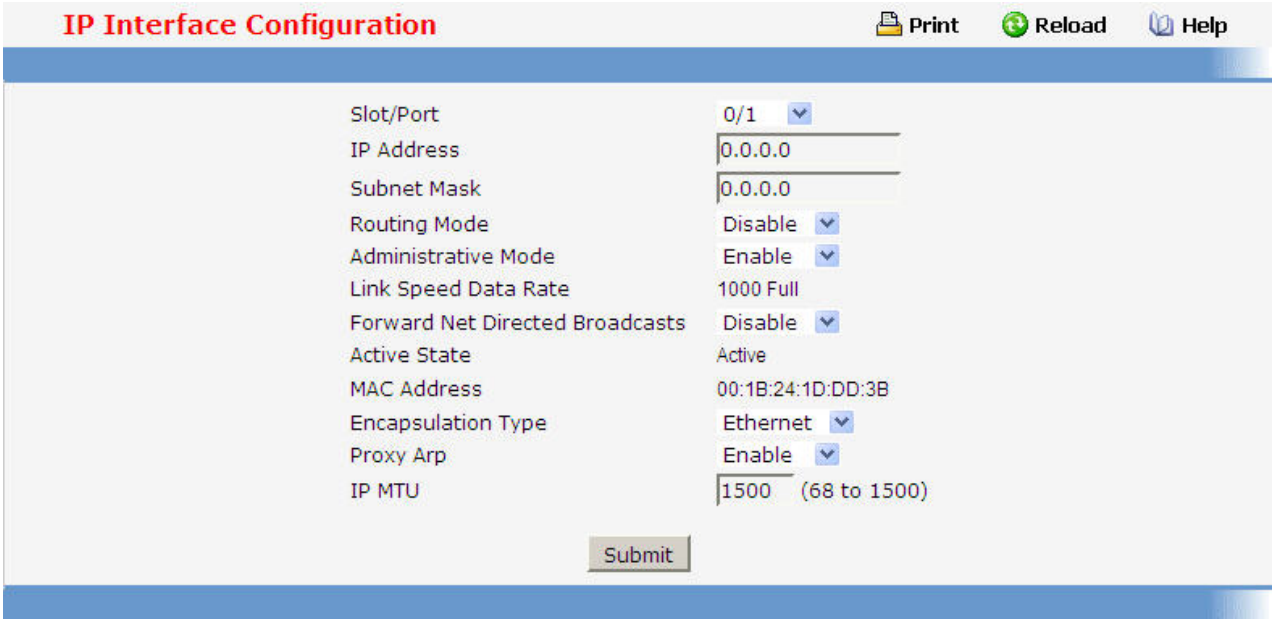

8.2.3.3 **Managing OSPF**

Configuring OSPF

Configurable Data

Router ID - The 32 bit integer in dotted decimal format that uniquely identifies the router within the autonomous system (AS). If you want to change the Router ID you must first disable OSPF. After you set the new Router ID, you must re-enable OSPF to have the change take effect. The default value is 0.0.0.0, although this is not a valid Router ID.

OSPF Admin Mode* - Select enable or disable from the pulldown menu. If you select enable OSPF will be activated for the switch. The default value is disable. You must configure a Router ID before OSPF can become operational. You do this on the IP Configuration page or by issuing the CLI command: config router id.

***NOTE: once OSPF is initialized on the router, it will remain initialized until the router is reset.**

RFC 1583 Compatibility - Select enable or disable from the pulldown menu to specify the preference rules that will be used when choosing among multiple AS-external-LSAs advertising the same destination. If you select enable, the preference rules will be those defined by RFC 1583. If you select disable, the preference rules will be those defined in Section 16.4.1 of the OSPF-2 standard (RFC 2328), which will prevent routing loops when AS-external-LSAs for the same destination have been originated from different areas. The default value is 'enable'. To prevent routing loops, you should select 'disable', but only if all OSPF routers in the routing domain are capable of operating according to RFC 2328.

Exit Overflow Interval - Enter the number of seconds that, after entering overflow state, the router should wait before attempting to leave overflow state. This allows the router to again originate

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non-default AS-external-LSAs. If you enter 0, the router will not leave Overflow State until restarted. The range is 0 to 2147483647 seconds.

Default Metric - Sets a default for the metric of redistributed routes.This field displays the default metric if one has already been set or blank if not configured earlier. The valid values are (1 to 16777215)

Maximum Paths - Sets the maximum number of paths that OSPF can report for a given destination. The valid values are (1 to 6).

Default Information Originate - Enable or Disable Default Route Advertise.

Always - Sets the router advertise 0.0.0.0/0.0.0.0 when set to "True".

Metric - Specifies the metric of the default route. The valid values are (0 to 16777215)

Metric Type - Sets the metric type of the default route.

Non-Configurable Data

ASBR Mode - Reflects whether the ASBR mode is enabled or disabled. Enable implies that the router is an autonomous system border router. Router automatically becomes an ASBR when it is configured to redistribute routes learnt from other protocol.

ABR Status - The values of this are enabled or disabled. Enabled implies that the router is an area border router. Disabled implies that it is not an area border router.

External LSA Count - The number of external (LS type 5) LSAs (link state advertisements) in the link state database.

External LSA Checksum - The sum of the LS checksums of the external LSAs (link state advertisements) contained in the link-state database. This sum can be used to determine if there has been a change in a router's link state database, and to compare the link-state databases of two routers.

New LSAs Originated - In any given OSPF area, a router will originate several LSAs. Each router originates a router-LSA. If the router is also the Designated Router for any of the area's networks, it will originate network-LSAs for those networks. This value represents the number of LSAs originated by this router.

LSAs Received - The number of LSAs (link state advertisements) received that were determined to be new instantiations. This number does not include newer instantiations of self-originated LSAs.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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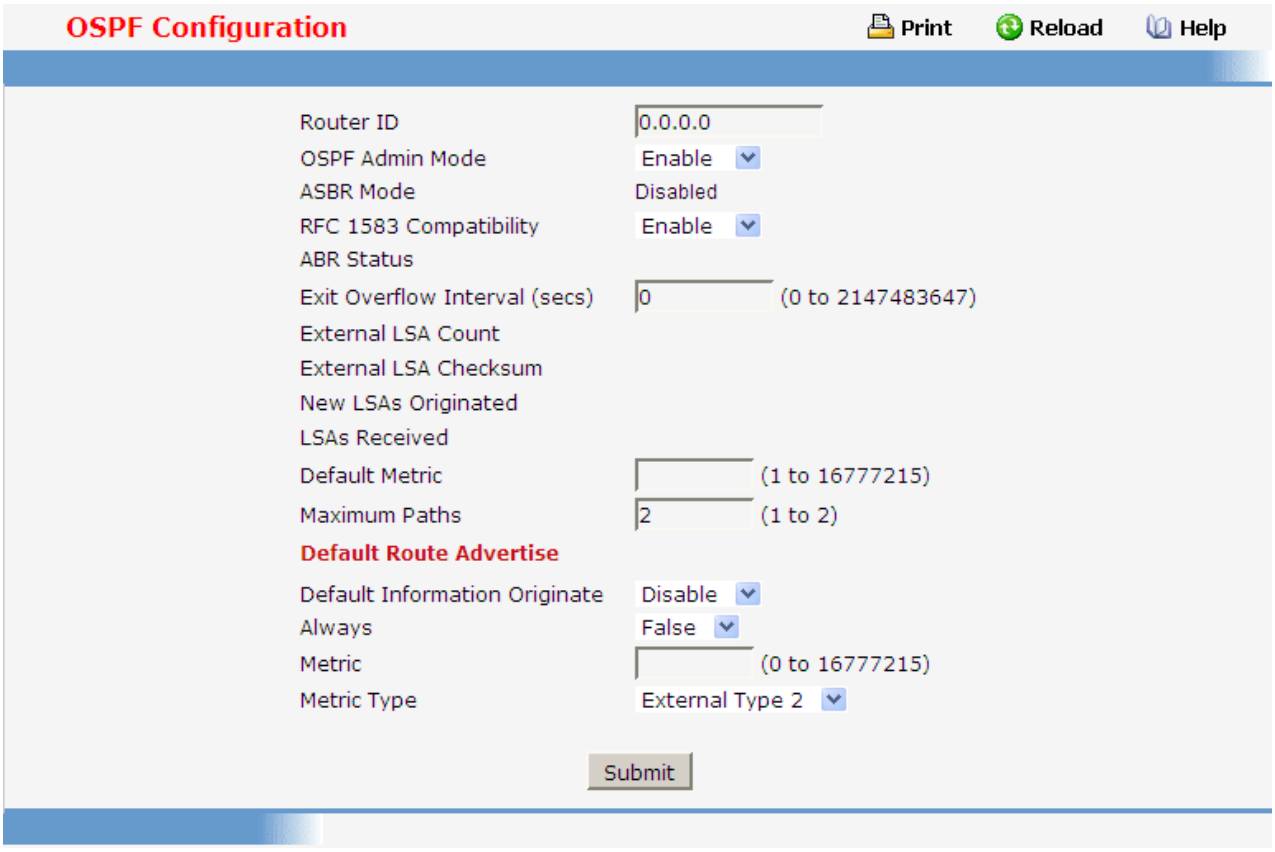

Configuring Area

Selection Criteria

Area ID - Select the area to be configured.

Configurable Data

Import Summary LSAs - Select enable or disable from the pulldown menu. If you select enable summary LSAs will be imported into stub areas.

Metric Value - Enter the metric value you want applied for the default route advertised into the stub area. Valid values range from 1 to 16,777,215.

Metric Type - Select the type of metric specified in the Metric Value field.

- ***OSPF Metric*** - Regular OSPF metric
- ***Comparable Cost*** - External Type 1 metrics that are comparable to the OSPF metric
- ***Non-comparable Cost*** - External Type 2 metrics that are assumed to be larger than the cost of the OSPF metric

Translator Role - Select Always or Candidate from the pulldown menu. A value of always will cause the router to assume the role of the translator when it becomes a border router and a value of candidate will cause the router to participate in the translator election process when it attains border router status.

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Translator Stability Interval - Enter the translator stability interval of the NSSA. The stability interval is the period of time that an elected translator continues to perform its duties after it determines that its translator status has been deposed by another router. Valid values range from 0 to 3600.

No-Redistribute Mode - Select enable or disable from the pulldown menu. If you select enable learned external routes will not be redistributed to the NSSA.

Non-Configurable Data

Area ID - The OSPF area. An Area ID is a 32 bit integer in dotted decimal format that uniquely identifies the area to which a router interface connects.

Aging Interval - The Link State Advertisement (LSA) aging timer interval.

External Routing - A definition of the router's capabilities for the area, including whether or not AS-external-LSAs are flooded into/throughout the area. If the area is a stub area, then these are the possible options for which you may configure the external routing capability, otherwise the only option is "Import External LSAs".

- ***Import External LSAs*** - Import and propagate external LSAs
- ***Import No LSAs*** - Do not import and propagate external LSAs

Authentication Type

Currently set to 'None'.

SPF Runs - The number of times that the intra-area route table has been calculated using this area's link-state database. This is typically done using Dijkstra's algorithm.

Area Border Router Count - The total number of area border routers reachable within this area. This is initially zero, and is calculated in each SPF Pass.

Area LSA Count - The total number of link-state advertisements in this area's link-state database, excluding AS External LSAs.

Area LSA Checksum - The 32-bit unsigned sum of the link-state advertisements' LS checksums contained in this area's link-state database. This sum excludes external (LS type 5) link-state advertisements. The sum can be used to determine if there has been a change in a router's link state database, and to compare the link-state database of two routers.

Mode - This field tells you whether the area is or is not a stub area. If the area may be a stub area, a 'Create Stub Area' button will be displayed. If you have configured the area as a stub area a 'Delete Stub Area' button will be displayed. Otherwise neither button will be displayed.

Type of Service - The type of service associated with the stub metric. The switch supports Normal only.

Translator Status - The field tells you the translator is enabled or disabled.

Command Buttons

Create Stub Area - Configure the area as a stub area.

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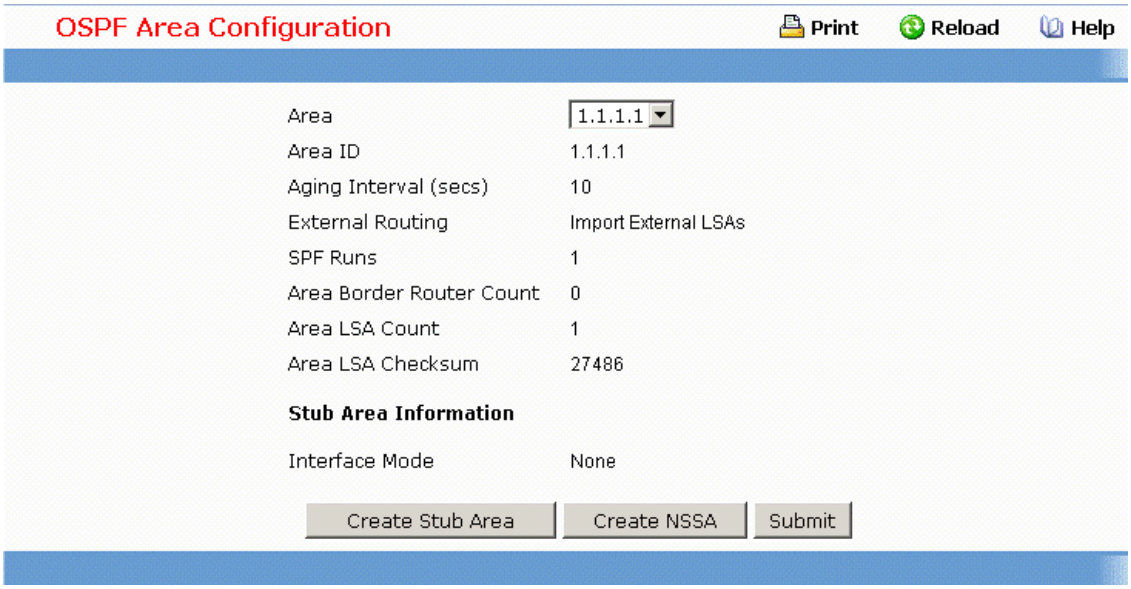
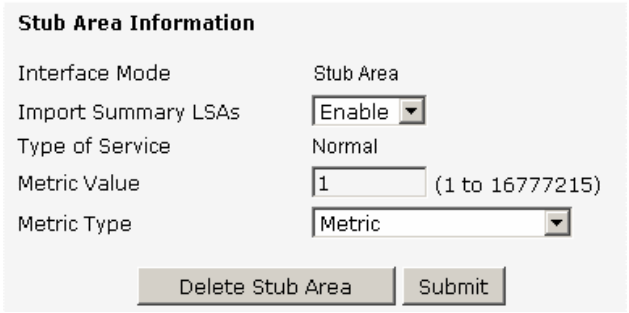
Delete Stub Area - Delete the stub area designation. The area will be returned to normal state.

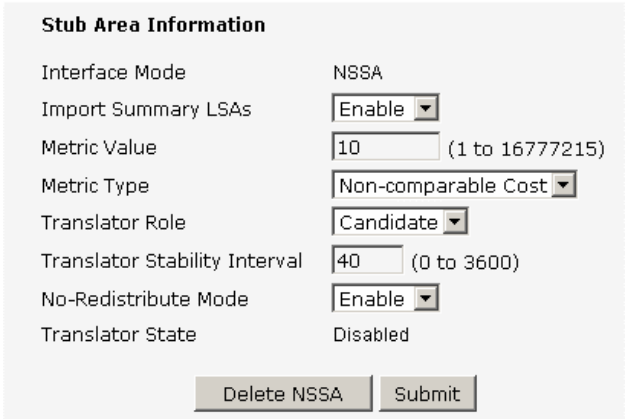
Create NSSA - Configure the area ads a NSSA

Delete NSSA - Delete the DSSA. The area will e returned to normal state.

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.







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Viewing Stub Area Summary Information

Non-Configurable Data

Area ID - The Area ID of the Stub area

Type of Service - The type of service associated with the stub metric. The switch supports Normal only.

Metric Value - Set the metric value you want applied for the default route advertised into the area. Valid values range from 1 to 16,777,215.

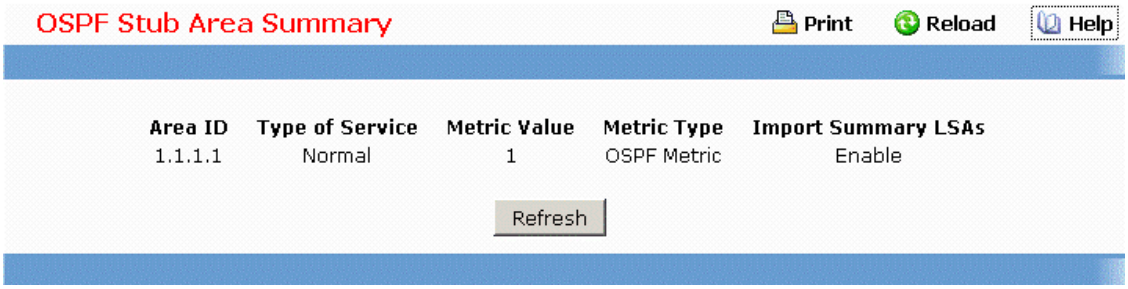
Metric Type - The type of metric for the stub area where valid types are:

- OSPF Metric - Regular OSPF metric
- Comparable Cost - External Type 1 metrics that are comparable to the OSPF metric
- Non-comparable Cost - External Type 2 metrics that are assumed to be larger than the cost of the OSPF metric

Import Summary LSAs - Whether the import of Summary LSAs is enabled or disabled.

Command Buttons

Refresh - Refresh the data on the screen to the current values from the switch.



Configuring Area Range

Selection Criteria

Area ID - Selects the area for which data is to be configured.

Configurable Data

IP address - Enter the IP Address for the address range for the selected area.

Subnet Mask - Enter the Subnet Mask for the address range for the selected area.

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LSDB Type - Select the type of Link Advertisement associated with the specified area and address range. The default type is 'Network Summary'.

Advertisement - Select enable or disable from the pulldown menu. If you selected enable the address range will be advertised outside the area via a Network Summary LSA. The default is enable.

Non-Configurable Data

Area ID - The OSPF area.

IP address - The IP Address of an address range for the area.

Subnet Mask - The Subnet Mask of an address range for the area.

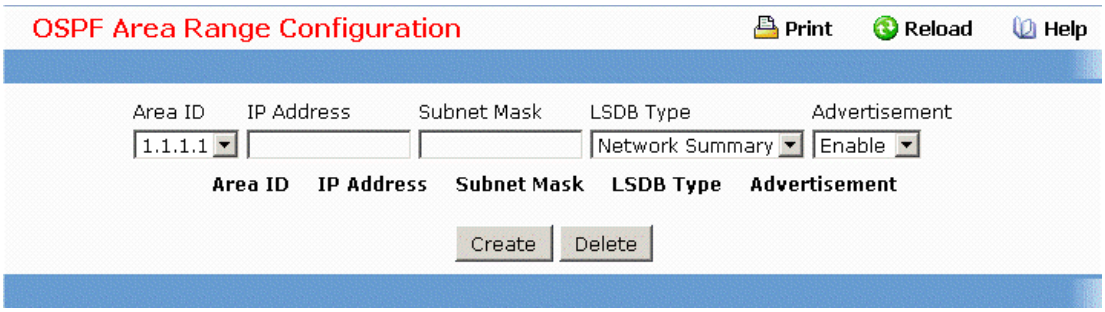
LSDB Type - The Link Advertisement type for the address range and area.

Advertisement - The Advertisement mode for the address range and area.

Command Buttons

Create - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed. The new address range will be added to the display in the non-configurable data area.

Delete - Removes the specified address range from the area configuration.



View Interface Statistics

This panel displays statistics for the selected interface. The information will be displayed only if OSPF is enabled.

Selection Criteria

Slot/Port - Select the interface for which data is to be displayed.

Non-Configurable Data

OSPF Area ID - The OSPF area to which the selected router interface belongs. An OSPF Area ID is a 32 bit integer in dotted decimal format that uniquely identifies the area to which the interface connects.

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SPF Runs - The number of times that the intra-area route table has been calculated using this area's link-state database.

Area Border Router Count - The total number of area border routers reachable within this area. This is initially zero, and is calculated in each SPF Pass.

AS Border Router Count - The total number of Autonomous System border routers reachable within this area. This is initially zero, and is calculated in each SPF Pass.

Area LSA Count - The total number of link-state advertisements in this area's link-state database, excluding AS External LSAs.

IP Address - The IP address of the interface.

Interface Events - The number of times the specified OSPF interface has changed its state, or an error has occurred.

Virtual Events - The number of state changes or errors that have occurred on this virtual link.

Neighbor Events - The number of times this neighbor relationship has changed state, or an error has occurred.

External LSA Count - The number of external (LS type 5) link-state advertisements in the link-state database.

Originate New LSAs - The number of new link-state advertisements that have been originated. In any given OSPF area, a router will originate several LSAs. Each router originates a router-LSA. If the router is also the Designated Router for any of the area's networks, it will originate network-LSAs for those networks.

LSAs Received - The number of link-state advertisements that have been received that have been determined to be new instantiations. This number does not include newer instantiations of self-originated link-state advertisements.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.

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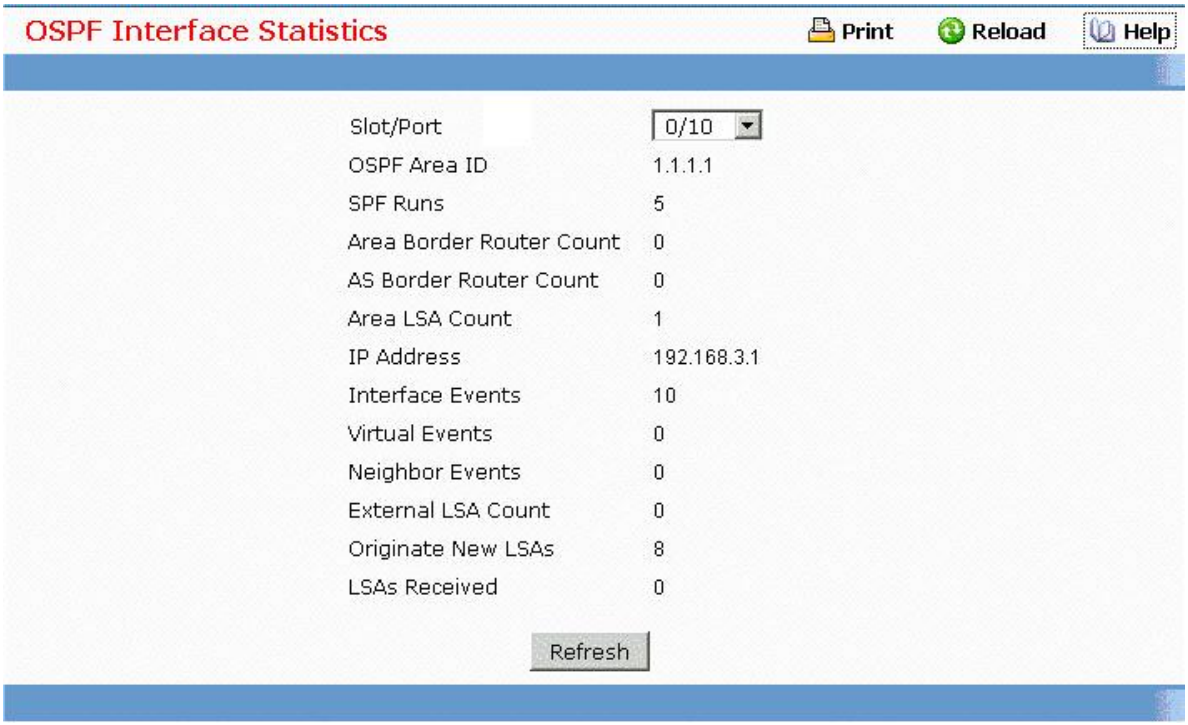

Configuring OSPF Interface

Selection Criteria

Slot/Port - Select the interface for which data is to be displayed or configured.

Configurable Data

OSPF Admin Mode* - You may select enable or disable from the pulldown menu. The default value is 'disable.' You can configure OSPF parameters without enabling OSPF Admin Mode, but they will have no effect until you enable Admin Mode. The following information will be displayed only if the Admin Mode is enabled: State, Designated Router, Backup Designated Router, Number of Link Events, LSA Ack Interval, and Metric Cost. For OSPF to be fully functional, you must enter a valid IP Address and Subnet Mask via the Interface IP Configuration page or through the CLI command: config ip interface network .

***NOTE: once OSPF is initialized on the router, it will remain initialized until the router is reset.**

OSPF Area ID - Enter the 32 bit integer in dotted decimal format that uniquely identifies the OSPF area to which the selected router interface connects. If you assign an Area ID which does not exist, the area will be created with default values.

Router Priority - Enter the OSPF priority for the selected interface. The priority of an interface is specified as an integer from 0 to 255. The default is 1, which is the highest router priority. A value of '0' indicates that the router is not eligible to become the designated router on this network

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Retransmit Interval - Enter the OSPF retransmit interval for the specified interface. This is the number of seconds between link-state advertisements for adjacencies belonging to this router interface. This value is also used when retransmitting database descriptions and link-state request packets. Valid values range from 1 to 3600 seconds (1 hour). The default is 5 seconds.

Hello Interval - Enter the OSPF hello interval for the specified interface in seconds. This parameter must be the same for all routers attached to a network. Valid values range from 1 to 65,535. The default is 10 seconds.

Dead Interval - Enter the OSPF dead interval for the specified interface in seconds. This specifies how long a router will wait to see a neighbor router's Hello packets before declaring that the router is down. This parameter must be the same for all routers attached to a network. This value should a multiple of the Hello Interval (e.g. 4). Valid values range from 1 to 2147483647. The default is 40.

Iftransit Delay Interval - Enter the OSPF Transit Delay for the specified interface. This specifies the estimated number of seconds it takes to transmit a link state update packet over the selected interface. Valid values range from 1 to 3600 seconds (1 hour). The default value is 1 second.

MTU Ignore - Disables OSPF MTU mismatch detection on receiving packets. Default value is Disable.

Authentication Type - You may select an authentication type other than none by clicking on the 'Configure' button. You will then see a new screen, where you can select the authentication type from the pulldown menu. The choices are:

- ***None*** - This is the initial interface state. If you select this option from the pulldown menu on the second screen you will be returned to the first screen and no authentication protocols will be run.
- ***Simple*** - If you select 'Simple' you will be prompted to enter an authentication key. This key will be included, in the clear, in the OSPF header of all packets sent on the network. All routers on the network must be configured with the same key.
- ***Encrypt*** - If you select 'Encrypt' you will be prompted to enter both an authentication key and an authentication ID. Encryption uses the MD5 Message-Digest algorithm. All routers on the network must be configured with the same key and ID.

Authentication Key - Enter the OSPF Authentication Key for the specified interface. If you do not choose to use authentication you will not be prompted to enter a key. If you choose 'simple' authentication you cannot use a key of more than 8 octets. If you choose 'encrypt' the key may be up to 16 octets long. The key value will only be displayed if you are logged on with Read/Write privileges, otherwise it will be displayed as asterisks.

Authentication ID - Enter the ID to be used for authentication. You will only be prompted to enter an ID when you select 'Encrypt' as the authentication type. The ID is a number between 0 ad 255, inclusive.

Metric Cost - Enter the value on this interface for the cost TOS (type of service). The range for the metric cost is between 1 and 65,535. Metric Cost is only configurable/displayed if OSPF is initialized on the interface.

Non-Configurable Data

IP Address - The IP address of the interface.

Subnet Mask - The subnet/network mask, that indicates the portion of the IP interface address that identifies the attached network.

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LSA Ack Interval - The number of seconds between LSA Acknowledgment packet transmissions, which must be less than the Retransmit Interval.

OSPF Interface Type - The OSPF interface type, which will always be broadcast.

State - The current state of the selected router interface. One of:

- ***Down*** - This is the initial interface state. In this state, the lower-level protocols have indicated that the interface is unusable. In this state, interface parameters will be set to their initial values. All interface timers will be disabled, and there will be no adjacencies associated with the interface.
- ***Loopback*** - In this state, the router's interface to the network is looped back either in hardware or software. The interface is unavailable for regular data traffic. However, it may still be desirable to gain information on the quality of this interface, either through sending ICMP pings to the interface or through something like a bit error test. For this reason, IP packets may still be addressed to an interface in Loopback state. To facilitate this, such interfaces are advertised in router- LSAs as single host routes, whose destination is the IP interface address.
- ***Waiting*** - The router is trying to determine the identity of the (Backup) Designated Router for the network by monitoring received Hello Packets. The router is not allowed to elect a Backup Designated Router or a Designated Router until it transitions out of Waiting state. This prevents unnecessary changes of (Backup) Designated Router.
- ***Designated Router*** - This router is itself the Designated Router on the attached network. Adjacencies are established to all other routers attached to the network. The router must also originate a network-LSA for the network node. The network- LSA will contain links to all routers (including the Designated Router itself) attached to the network.
- ***Backup Designated Router*** - This router is itself the Backup Designated Router on the attached network. It will be promoted to Designated Router if the present Designated Router fails. The router establishes adjacencies to all other routers attached to the network. The Backup Designated Router performs slightly different functions during the Flooding Procedure, as compared to the Designated Router.
- ***Other Designated Router*** - The interface is connected to a broadcast or NBMA network on which other routers have been selected to be the Designated Router and Backup Designated Router either. The router attempts to form adjacencies to both the Designated Router and the Backup Designated Router.

The State is only displayed if the OSPF admin mode is enabled.

Designated Router - The identity of the Designated Router for this network, in the view of the advertising router. The Designated Router is identified here by its router ID. The value 0.0.0.0 means that there is no Designated Router. This field is only displayed if the OSPF admin mode is enabled.

Backup Designated Router - The identity of the Backup Designated Router for this network, in the view of the advertising router. The Backup Designated Router is identified here by its router ID. Set to 0.0.0.0 if there is no Backup Designated Router. This field is only displayed if the OSPF admin mode is enabled.

Number of Link Events - This is the number of times the specified OSPF interface has changed its state. This field is only displayed if the OSPF admin mode is enabled.

Command Buttons

Configure Authentication - Display a new screen where you can select the authentication method for the virtual link.

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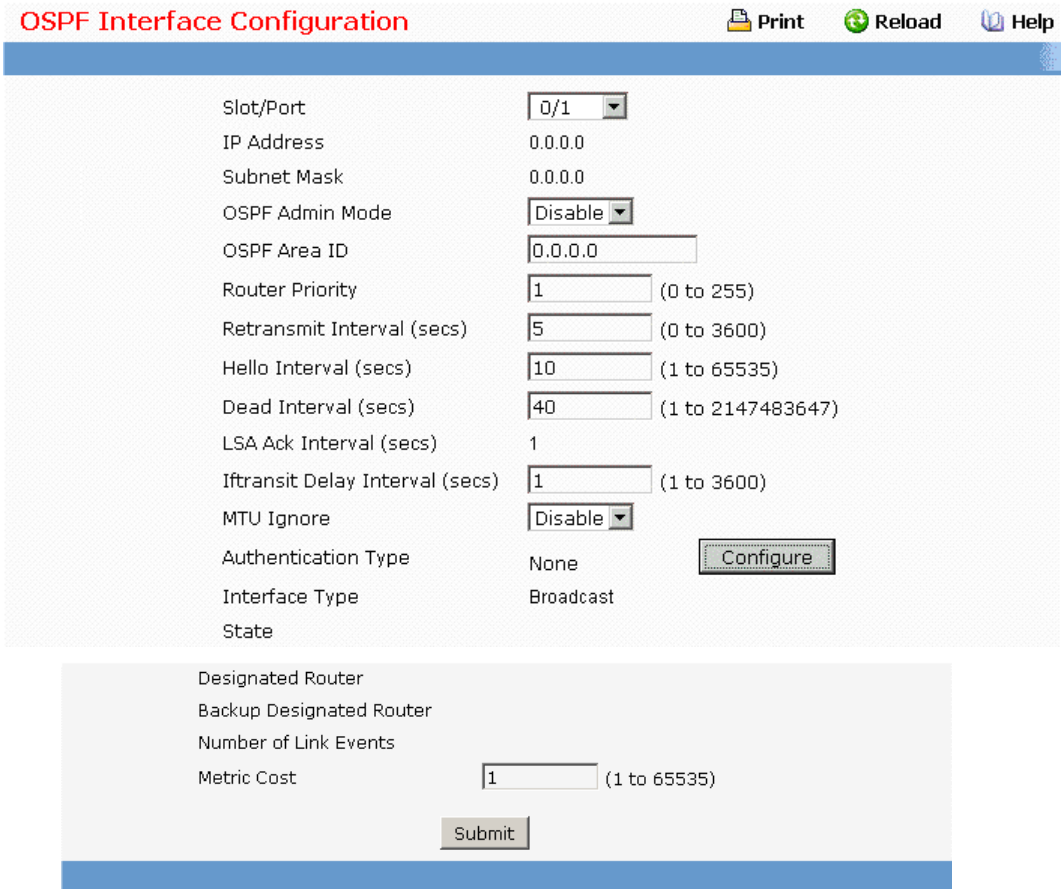
Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Viewing Neighbor Table Information

This panel displays the OSPF neighbor table list. When a particular neighbor ID is specified, detailed information about a neighbor is given. The information below will only be displayed if OSPF is enabled.

Selection Criteria

Slot/Port - Selects the interface for which data is to be displayed or configured. Slot 0 is the base unit.

Non-Configurable Data

Router ID - A 32 bit integer in dotted decimal format representing the neighbor interface.

IP Address - The IP address of the neighboring router's interface to the attached network. It is used as the destination IP address when protocol packets are sent as unicasts along this adjacency. Also used in router-LSAs as the Link ID for the attached network if the neighboring router is selected to be

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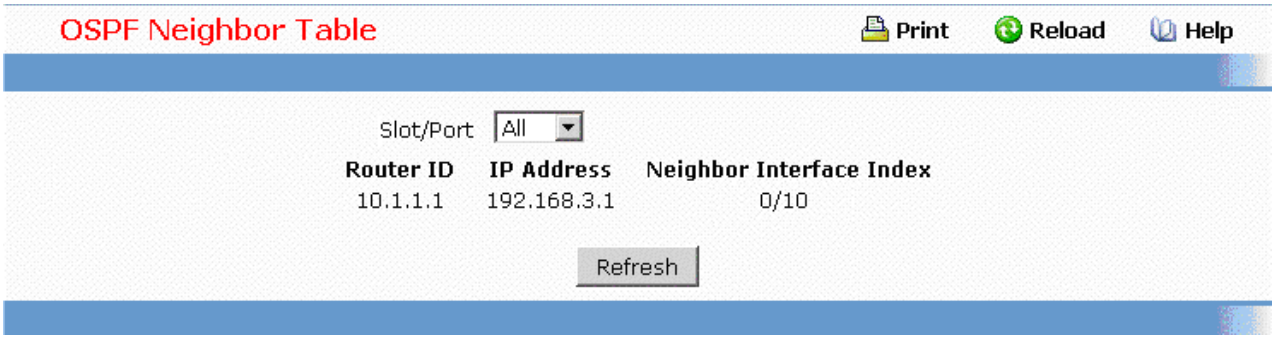
designated router. The Neighbor IP address is learned when Hello packets are received from the neighbor. For virtual links, the Neighbor IP address is learned during the routing table build process.

Neighbor Interface Index - A Slot/Port identifying the neighbor interface index.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.



Configuring OSPF Neighbor

This panel displays the OSPF neighbor configuration for a selected neighbor ID. When a particular neighbor ID is specified, detailed information about a neighbor is given. The information below will only be displayed if OSPF is enabled and the interface has a neighbor. The IP address is the IP address of the neighbor.

Selection Criteria

Slot/Port - Selects the interface for which data is to be displayed or configured. Slot 0 is the base unit.

Neighbor IP Address - Selects the IP Address of the neighbor for which data is to be displayed.

Non-Configurable Data

Router ID - A 32 bit integer in dotted decimal format that identifies the neighbor router.

Options - The optional OSPF capabilities supported by the neighbor. The neighbor's optional OSPF capabilities are also listed in its Hello packets. This enables received Hello Packets to be rejected (i.e., neighbor relationships will not even start to form) if there is a mismatch in certain crucial OSPF capabilities.

Router Priority - Displays the OSPF priority for the specified neighbor. The priority of a neighbor is a priority integer from 0 to 255. A value of '0' indicates that the router is not eligible to become the designated router on this network.

State - The state of a neighbor can be the following:

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- ***Down*** - This is the initial state of a neighbor conversation. It indicates that there has been no recent information received from the neighbor. On NBMA networks, Hello packets may still be sent to "Down" neighbors, although at a reduced frequency.
- ***Attempt*** - This state is only valid for neighbors attached to NBMA networks. It indicates that no recent information has been received from the neighbor, but that a more concerted effort should be made to contact the neighbor. This is done by sending the neighbor Hello packets at intervals of Hello Interval.
- ***Init*** - In this state, a Hello packet has recently been seen from the neighbor. However, bidirectional communication has not yet been established with the neighbor (i.e., the router itself did not appear in the neighbor's Hello packet). All neighbors in this state (or greater) are listed in the Hello packets sent from the associated interface.
- ***2-Way*** - In this state, communication between the two routers is bidirectional. This has been assured by the operation of the Hello Protocol. This is the most advanced state short of beginning adjacency establishment. The (Backup) Designated Router is selected from the set of neighbors in state 2-Way or greater.
- ***Exchange Start*** - This is the first step in creating an adjacency between the two neighboring routers. The goal of this step is to decide which router is the master, and to decide upon the initial DD sequence number. Neighbor conversations in this state or greater are called adjacencies.
- ***Exchange*** - In this state the router is describing its entire link state database by sending Database Description packets to the neighbor. In this state, Link State Request Packets may also be sent asking for the neighbor's more recent LSAs. All adjacencies in Exchange state or greater are used by the flooding procedure. These adjacencies are fully capable of transmitting and receiving all types of OSPF routing protocol packets.
- ***Loading*** - In this state, Link State Request packets are sent to the neighbor asking for the more recent LSAs that have been discovered (but not yet received) in the Exchange state.
- ***Full*** - In this state, the neighboring routers are fully adjacent. These adjacencies will now appear in router-LSAs and network-LSAs.

Events - The number of times this neighbor relationship has changed state, or an error has occurred.

Permanence - This variable displays the status of the entry. 'dynamic' and 'permanent' refer to how the neighbor became known.

Hellos Suppressed - This indicates whether Hellos are being suppressed to the neighbor.

Retransmission Queue Length - The current length of the retransmission queue.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.

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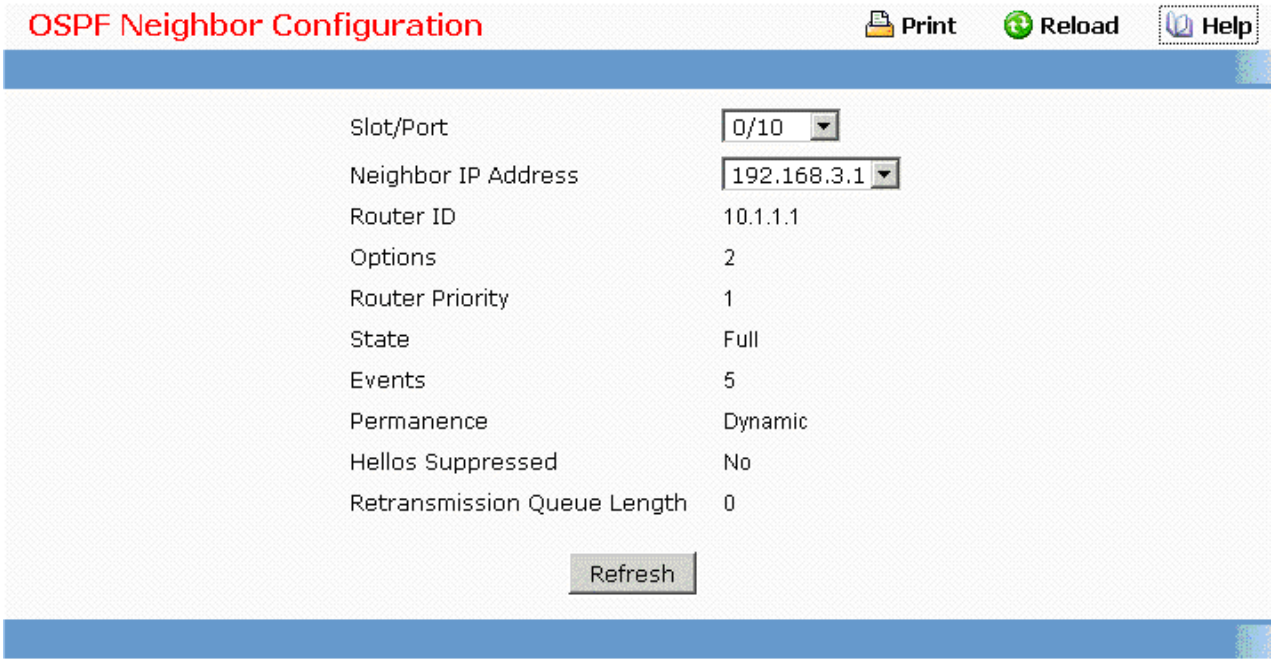

Viewing OSPF Link State Database

Non-Configurable Data

Router ID - The 32 bit integer in dotted decimal format that uniquely identifies the router within the autonomous system (AS). The Router ID is set on the IP Configuration page. If you want to change the Router ID you must first disable OSPF. After you set the new Router ID, you must re-enable OSPF to have the change take effect. The default value is 0.0.0.0, although this is not a valid Router ID.

Area ID - The ID of an OSPF area to which one of the router interfaces is connected. An Area ID is a 32 bit integer in dotted decimal format that uniquely identifies the area to which an interface is connected.

LSA Type - The format and function of the link state advertisement. One of the following:

- ***Router Links***
- ***Network Links***
- ***Network Summary***
- ***ASBR Summary***
- ***AS-external***

LS ID - The Link State ID identifies the piece of the routing domain that is being described by the advertisement. The value of the LS ID depends on the advertisement's LS type.

Age - The time since the link state advertisement was first originated, in seconds.

Sequence - The sequence number field is a signed 32-bit integer. It is used to detect old and duplicate link state advertisements. The larger the sequence number, the more recent the advertisement.

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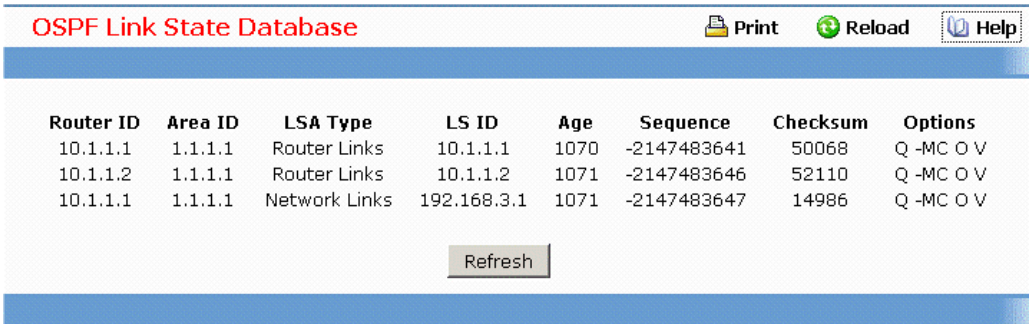
Checksum - The checksum is used to detect data corruption of an advertisement. This corruption can occur while an advertisement is being flooded, or while it is being held in a router's memory. This field is the checksum of the complete contents of the advertisement, except the LS age field.

Options - The Options field in the link state advertisement header indicates which optional capabilities are associated with the advertisement. The options are:

- ***Q*** - This enables support for QoS Traffic Engineering.
- ***E*** - This describes the way AS-external-LSAs are flooded.
- ***MC*** - This describes the way IP multicast datagrams are forwarded according to the standard specifications.
- ***O*** - This describes whether Opaque-LSAs are supported.
- ***V*** - This describes whether OSPF++ extensions for VPN/COS are supported.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.



Configuring OSPF Virtual Link

Selection Criteria

Create New Virtual Link - Select this option from the dropdown menu to define a new virtual link. The area portion of the virtual link identification is fixed: you will be prompted to enter the Neighbor Router ID on a new screen.

Area ID and Neighbor Router ID - Select the virtual link for which you want to display or configure data. It consists of the Area ID and Neighbor Router ID.

Configurable Data

Neighbor Router ID - Enter the neighbor portion of a Virtual Link specification. Virtual links may be configured between any pair of area border routers having interfaces to a common (non-backbone) area. You only enter this ID when you are creating a new virtual link.

Hello Interval - Enter the OSPF hello interval for the specified interface in seconds. This parameter must be the same for all routers attached to a network. Valid values range from 1 to 65,535. The default is 10 seconds. .

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Dead Interval - Enter the OSPF dead interval for the specified interface in seconds. This specifies how long a router will wait to see a neighbor router's Hello packets before declaring that the router is down. This parameter must be the same for all routers attached to a network. This value should a multiple of the Hello Interval (e.g. 4). Valid values range from 1 to 2147483647. The default is 40.

Iftransit Delay Interval - Enter the OSPF Transit Delay for the specified interface. This specifies the estimated number of seconds it takes to transmit a link state update packet over the selected interface. Valid values range from 1 to 3600 seconds (1 hour). The default value is 1 second.

Retransmit Interval - Enter the OSPF retransmit interval for the specified interface. This is the number of seconds between link-state advertisements for adjacencies belonging to this router interface. This value is also used when retransmitting database descriptions and link-state request packets. Valid values range from 1 to 3600 seconds (1 hour). The default is 5 seconds.

Authentication Type - You may select an authentication type other than none by clicking on the 'Configure Authentication' button. You will then see a new screen, where you can select the authentication type from the pulldown menu. The choices are:

- ***None*** - This is the initial interface state. If you select this option from the pulldown menu on the second screen you will be returned to the first screen.
- ***Simple*** - If you select 'Simple' you will be prompted to enter an authentication key. This key will be included, in the clear, in the OSPF header of all packets sent on the network. All routers on the network must be configured with the same key.
- ***Encrypt*** - If you select 'Encrypt' you will be prompted to enter both an authentication key and an authentication ID. Encryption uses the MD5 Message-Digest algorithm. All routers on the network must be configured with the same key and ID.

Authentication Key - Enter the OSPF Authentication Key for the specified interface. If you do not choose to use authentication you will not be prompted to enter a key. If you choose 'simple' authentication you cannot use a key of more than 8 octets. If you choose 'encrypt' the key may be up to 16 octets long. The key value will only be displayed if you are logged on with Read/Write privileges, otherwise it will be displayed as asterisks.

Authentication ID - Enter the ID to be used for authentication. You will only be prompted to enter an ID when you select 'Encrypt' as the authentication type. The ID is a number between 0 ad 255, inclusive.

Non-Configurable Data

Down - This is the initial interface state. In this state, the lower-level protocols have indicated that the interface is unusable. In this state, interface parameters will be set to their initial values. All interface timers will be disabled, and there will be no adjacencies associated with the interface.

Waiting - The router is trying to determine the identity of the (Backup) Designated Router by monitoring received Hello Packets. The router is not allowed to elect a Backup Designated Router or a Designated Router until it transitions out of Waiting state. This prevents unnecessary changes of (Backup) Designated Router.

Point-to-Point - The interface is operational, and is connected to the virtual link. On entering this state the router attempts to form an adjacency with the neighboring router. Hello Packets are sent to the neighbor every HelloInterval seconds.

Designated Router - This router is itself the Designated Router on the attached network. Adjacencies are established to all other routers attached to the network. The router must also originate a

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network-LSA for the network node. The network- LSA will contain links to all routers (including the Designated Router itself) attached to the network.

Backup Designated Router - This router is itself the Backup Designated Router on the attached network. It will be promoted to Designated Router if the present Designated Router fails. The router establishes adjacencies to all other routers attached to the network. The Backup Designated Router performs slightly different functions during the Flooding Procedure, as compared to the Designated Router.

Other Designated Router - The interface is connected to a broadcast or NBMA network on which other routers have been selected to be the Designated Router and Backup Designated Router. The router attempts to form adjacencies to both the Designated Router and the Backup Designated Router.

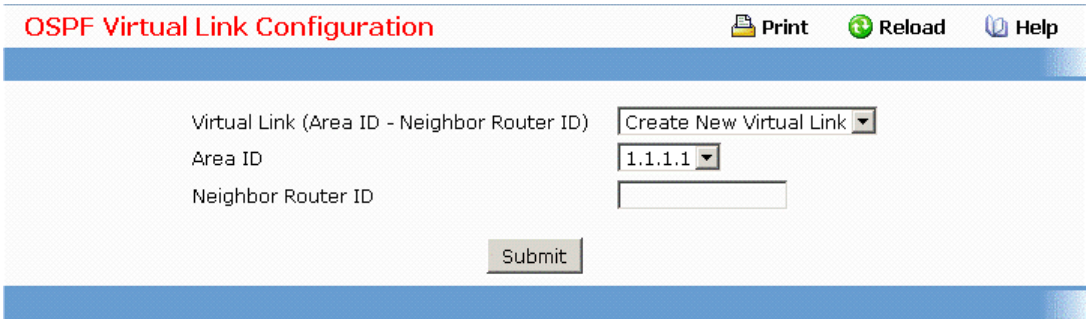
Neighbor State - The state of the Virtual Neighbor Relationship.

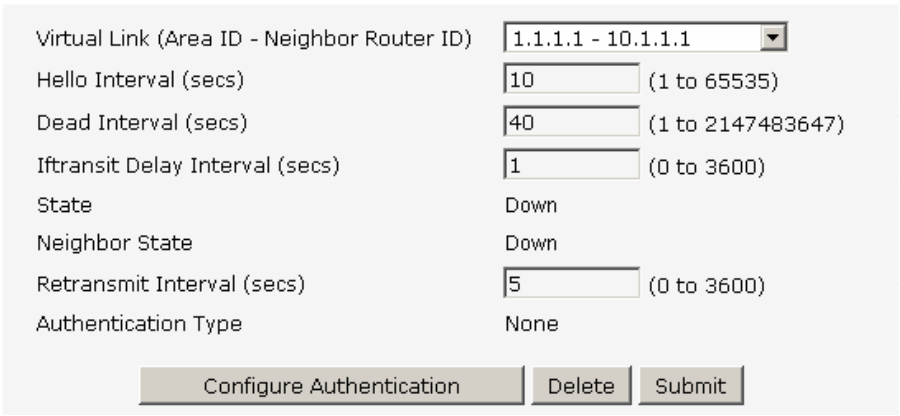
Command Buttons

Configure Authentication - Display a new screen where you can select the authentication method for the virtual link.

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Removes the specified virtual link from the router configuration.





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Viewing OSPF Virtual Link Summary Table

Non-Configurable Data

Area ID - The Area ID portion of the virtual link identification for which data is to be displayed. The Area ID and Neighbor Router ID together define a virtual link.

Neighbor Router ID - The neighbor portion of the virtual link identification. Virtual links may be configured between any pair of area border routers having interfaces to a common (non-backbone) area.

Hello Interval - The OSPF hello interval for the virtual link in units of seconds. The value for hello interval must be the same for all routers attached to a network.

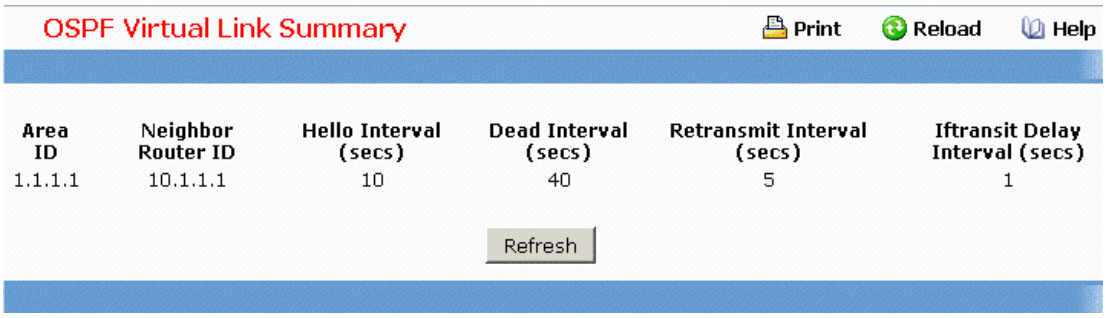
Dead Interval - The OSPF dead interval for the virtual link in units of seconds. This specifies how long a router will wait to see a neighbor router's Hello packets before declaring that the router is down. This parameter must be the same for all routers attached to a common network, and should be a multiple of the Hello Interval (i.e. 4).

Retransmit Interval - The OSPF retransmit interval for the virtual link in units of seconds. This specifies the time between link-state advertisements for adjacencies belonging to this router interface. This value is also used when retransmitting database descriptions and link-state request packets.

Iftransit Delay Interval - The OSPF Transit Delay for the virtual link in units of seconds. It specifies the estimated number of seconds it takes to transmit a link state update packet over this interface.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.



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Configuring OSPF Route Redistribution

This screen can be used to configure the OSPF Route Redistribution parameters. The allowable values for each fields are displayed next to the field. If any invalid values are entered, an alert message will be displayed with the list of all the valid values.

Configurable Data

Configured Source - This select box is a dynamic selector and would be populated by only those Source Routes that have already been configured for redistribute by OSPF. However, the topmost option in the select box would be "Create", and this allows the user to configure another, among the Available Source Routes. The valid values are 'Static', 'Connected', 'RIP' ,'BGP' and 'Create'.

Available Source - This select box is a dynamic selector and would be populated by only those Source Routes that have not previously been configured for redistribution by OSPF. This select box would appear only if the user selects "Create" option as Configured Source. The valid values are 'Static', 'Connected', 'RIP' and 'BGP'.

Metric- Sets the metric value to be used as the metric of redistributed routes. This field displays the metric if the source was pre-configured and can be modified. The valid values are (0 to 16777215)

Metric Type - Sets the OSPF metric type of redistributed routes.

Tag - Sets the tag field in routes redistributed. This field displays the tag if the source was pre-configured, otherwise 0 and can be modified. The valid values are 0 to 4294967295.

Subnets - Sets whether the subnetted routes should be redistributed or not.

Distribute List - Sets the Access List that filters the routes to be redistributed by the destination protocol. Only permitted routes are redistributed. If this command refers to a non-existent access list, all routes are permitted. The valid values for Access List IDs are (1 to 199). When used for route filtering, the only fields in an access list that get used are

- ***Source IP Address and netmask***
- ***Destination IP Address and netmask***
- ***Action (permit or deny)***

All other fields (source and destination port, precedence, tos, etc.) are ignored.
The source IP address is compared to the destination IP address of the route. The source IP netmask in the access list rule is treated as a wildcard mask, indicating which bits in the source IP address must match the destination address of the route. (Note that a 1 in the mask indicates a "don't care" in the corresponding address bit.)
When an access list rule includes a destination IP address and netmask (an extended access list), the destination IP address is compared to the network mask of the destination of the route. The destination netmask in the access list serves as a wildcard mask, indicating which bits in the route's destination mask are significant for the filtering operation.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately.

Delete - Delete the entry of the Source Route selected as Configured Source from the list of Sources configured for OSPF Route Redistribution.

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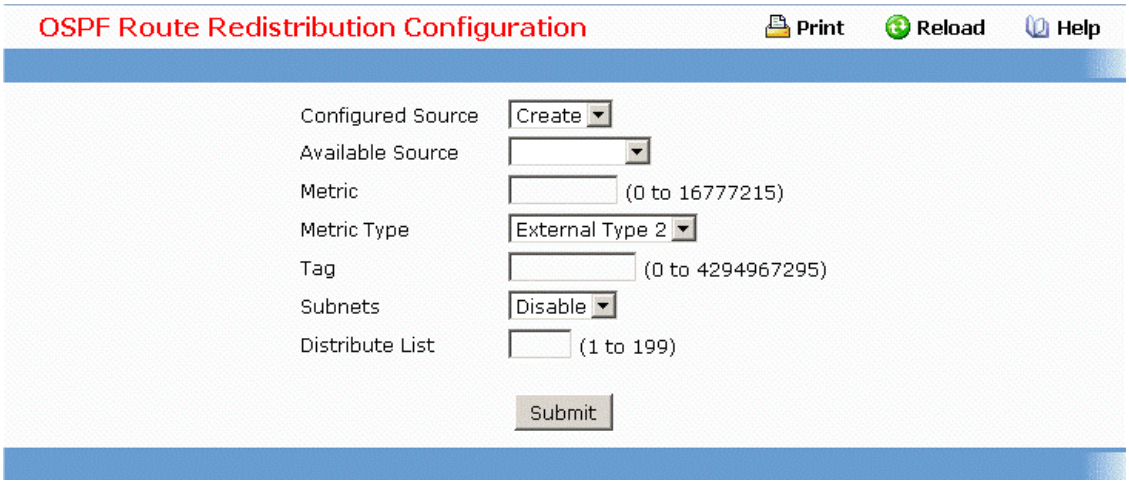

Viewing OSPF Route Redistribution Summary Information

This screen displays the OSPF Route Redistribution Configurations.

Non Configurable Data

Source - The Source Route to be Redistributed by OSPF.

Metric- The Metric of redistributed routes for the given Source Route. Display "Unconfigured" when not configured.

Metric Type - The OSPF metric types of redistributed routes.

Tag - The tag field in routes redistributed. This field displays the tag if the source was pre-configured, otherwise 0 and can be modified. The valid values are 0 to 4294967295.

Subnets - Whether the subnetted routes should be redistributed or not.

Distribute List - The Access List that filters the routes to be redistributed by the Destination Protocol. Display 0 when not configured.

Command Buttons

Refresh - Displays the latest OSPF Route Redistribution Configuration data.

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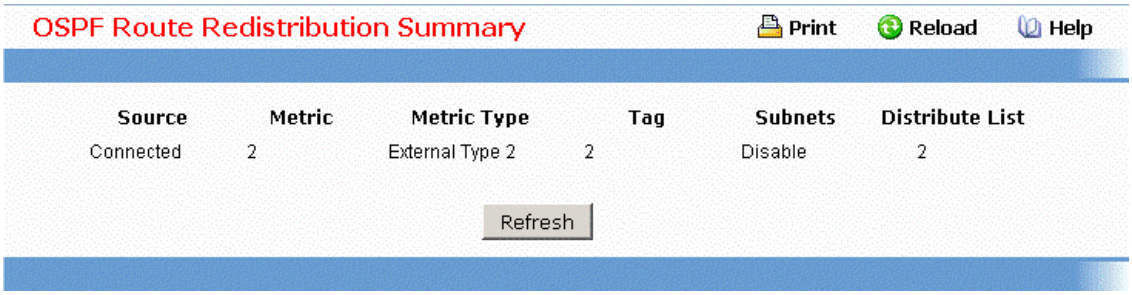

8.2.3.4 **Managing BOOTP/DHCP Relay Agent**

Configuring BOOTP/DHCP Relay Agent

Configurable Data

Maximum Hop Count - Enter the maximum number of hops a client request can take before being discarded.

Server IP Address - Enter either the IP address of the BOOTP/DHCP server or the IP address of the next BOOTP/DHCP Relay Agent.

Admin Mode - Select enable or disable from the pulldown menu. When you select 'enable' BOOTP/DHCP requests will be forwarded to the IP address you entered in the 'Server IP address' field.

Minimum Wait Time - Enter a time in seconds. This value will be compared to the time stamp in the client's request packets, which should represent the time since the client was powered up. Packets will only be forwarded when the time stamp exceeds the minimum wait time.

Circuit Id Option Mode - Select enable or disable from the pulldown menu. If you select 'enable' Relay Agent options will be added to requests before they are forwarded to the server and removed from replies before they are forwarded to clients.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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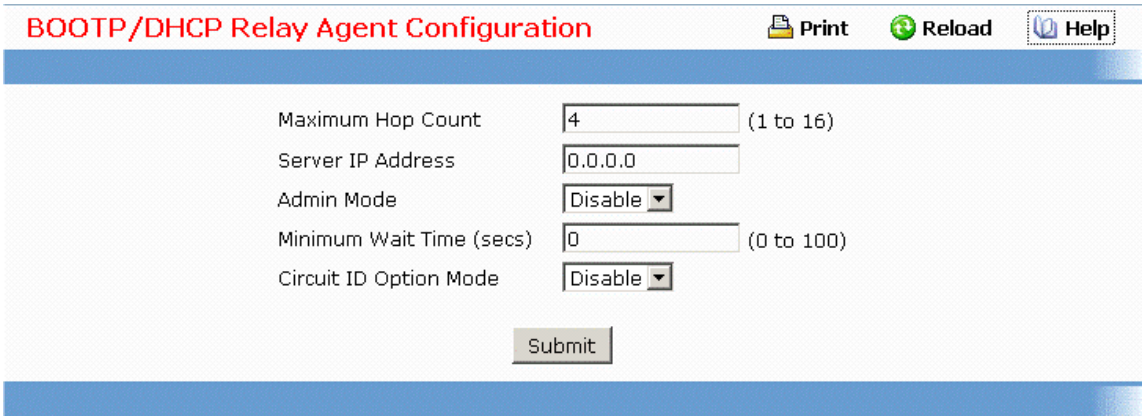

Viewing BOOTP/DHCP Relay Agent Status

Non-Configurable Data

Maximum Hop Count - The maximum number of Hops a client request can go without being discarded.

Server IP Address - IP address of the BOOTP/DHCP server or the IP address of the next BOOTP/DHCP Relay Agent.

Admin Mode - Administrative mode of the relay. When you select 'enable' BOOTP/DHCP requests will be forwarded to the IP address you entered in the 'Server IP address' field.

Minimum Wait Time - The Minimum time in seconds. This value will be compared to the time stamp in the client's request packets, which should represent the time since the client was powered up. Packets will only be forwarded when the time stamp exceeds the minimum wait time.

Circuit Id Option Mode - This is the Relay agent option which can be either enabled or disabled. When enabled Relay Agent options will be added to requests before they are forwarded to the server and removed from replies before they are forwarded to clients.

Requests Received - The total number of BOOTP/DHCP requests received from all clients since the last time the switch was reset.

Requests Relayed - The total number of BOOTP/DHCP requests forwarded to the server since the last time the switch was reset.

Packets Discarded - The total number of BOOTP/DHCP packets discarded by this Relay Agent since the last time the switch was reset.

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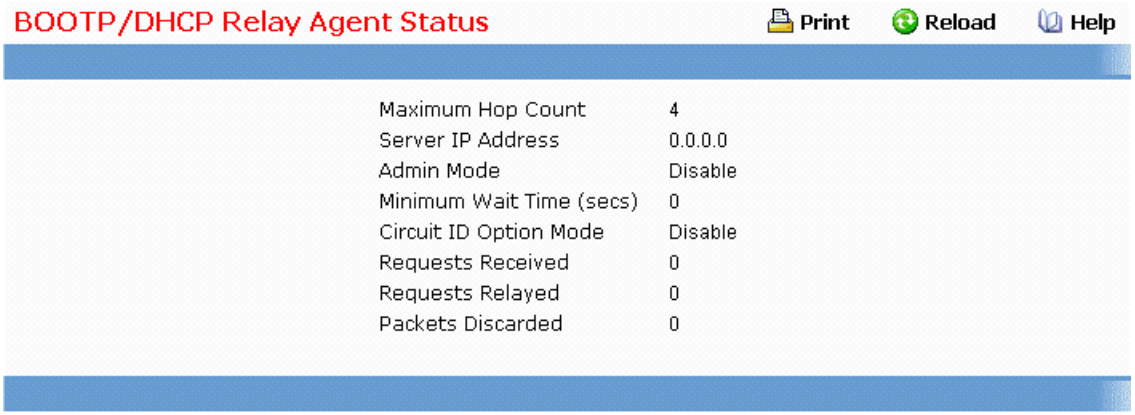

8.2.3.5 **Managing DNS Relay**

Configuring DNS Relay

The DNS protocol controls the Domain Name System (DNS), a distributed database with which you can map host names to IP addresses. When you configure DNS on your switch, you can substitute the host name for the IP address with all IP commands, such as ping, telnet, traceroute, and related Telnet support operations. To keep track of domain names, IP has defined the concept of a domain name server, which holds a cache (or database) of names mapped to IP addresses. To map domain names to IP addresses, you must first identify the host names, specify the name server that is present on your network, and enable the DNS.

Configurable Data

Admin Mode - Select enable or disable from the pull down menu. When you select 'enable', the IP Domain Naming System (DNS)-based host name-to-address translation will be enabled.

Default Domain Name - Default domain name used to complete unqualified host names. Do not include the initial period that separates an unqualified name from the domain name. This is a text string of up to 64 characters.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed

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Configuring Domain Name

You can use this panel to change the configuration parameters for the domain names that can be appended to incomplete host names (i.e., host names passed from a client that are not formatted with dotted notation). You can also use this screen to display the contents of the table.

Configurable Data

Domain - Specifies all the existing domain names along with an additional option "Create". When the user selects "Create" another text box "Domain Name" appears where the user may enter domain name to be configured.

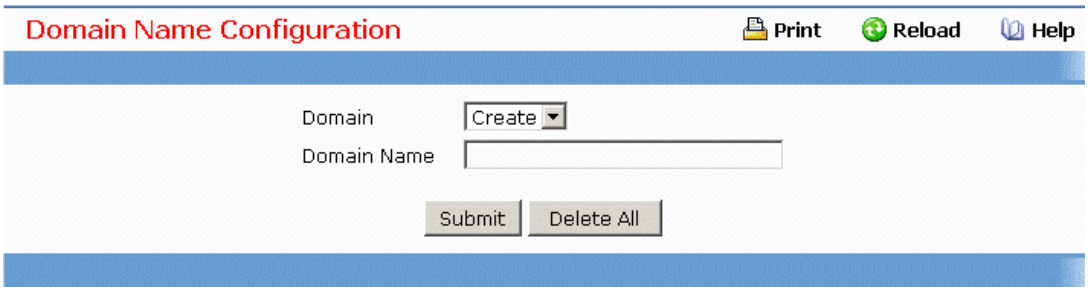
Domain Name - Specifies the domain name. Do not include the initial period that separates an unqualified name from the domain name. This is a text string of up to 64 characters.

Command Buttons

Submit - Sends the updated configuration to the switch. Configuration changes take effect immediately.

Delete - Deletes the domain name entry. Sends the updated configuration to the switch. Configuration changes take effect immediately.

Delete All - Deletes all the domain name entries. Sends the updated configuration to the switch. Configuration changes take effect immediately.



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Configuring Name Server

You can use this panel to change the configuration parameters for the domain name servers. You can also use this screen to display the contents of the table.

Configurable Data

Name Server - Specifies all the existing domain name servers along with an additional option "Create". When the user selects "Create" another text box "IP Address" appears where the user may enter domain name server to be configured.

IP Address - Specifies the address of the domain name server. This is a text string of up to 64 characters containing the encoded unicast IP address of a domain name server.

Non-Configurable Data

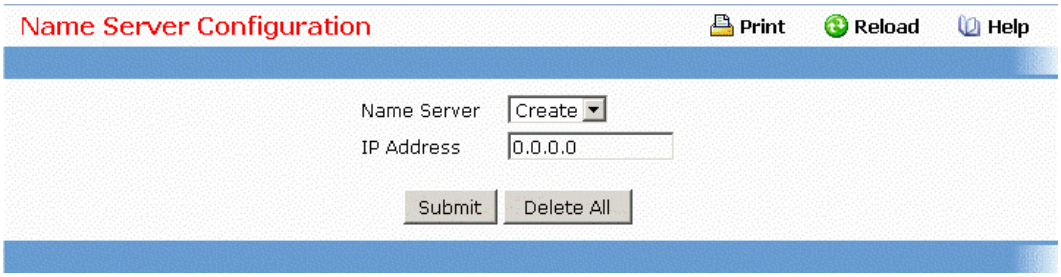
Request - Specifies the number of DNS requests since last time agent reboot.

Response - Specifies the number of DNS Server responses since last time agent reboot.

Command Buttons

Submit - Sends the updated configuration to the switch. Configuration changes take effect immediately.

Delete - Deletes the domain name server entry. Sends the updated configuration to the switch. Configuration changes take effect immediately.



Viewing DNS Cache Summary Information

The Domain Name System (DNS) dynamically maps domain name to Internet (IP) addresses. This panel displays the current contents of the DNS cache.

Non-Configurable Data

Domain Name List - The domain name associated with this record.

IP address - The IP address associated with this record.

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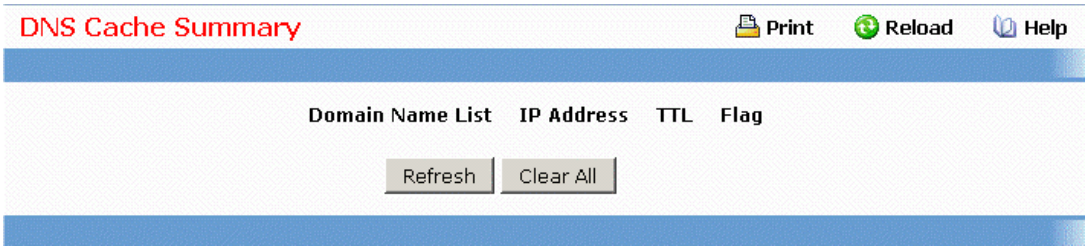
TTL - The time to live reported by the name server.

Flag - The flag of the record.

Command Buttons

Refresh - Refresh the page with the latest DNS cache entries.

Clear All - Clear all entries in the DNS cache.



Configuring DNS Host

You can use this screen to change the configuration parameters for the static entry in the DNS table. You can also use this screen to display the contents of the table.

Configurable Data

Domain - Specifies all the existing hosts along with an additional option "Create". When the user selects "Create" another text box "Domain Name" appears where the user may enter host to be configured.

Domain Name - Specifies the domain name of the host. This is a text string of up to 64 characters.

IP Address - Specifies the address of the host. This is a text string of up to 64 characters containing the encoded unicast IP address of a host.

Command Buttons

Submit - Sends the updated configuration to the switch. Configuration changes take effect immediately.

Delete - Deletes the host entry. Sends the updated configuration to the switch. Configuration changes take effect immediately.

Delete All - Deletes all the host entries. Sends the updated configuration to the switch. Configuration changes take effect immediately.

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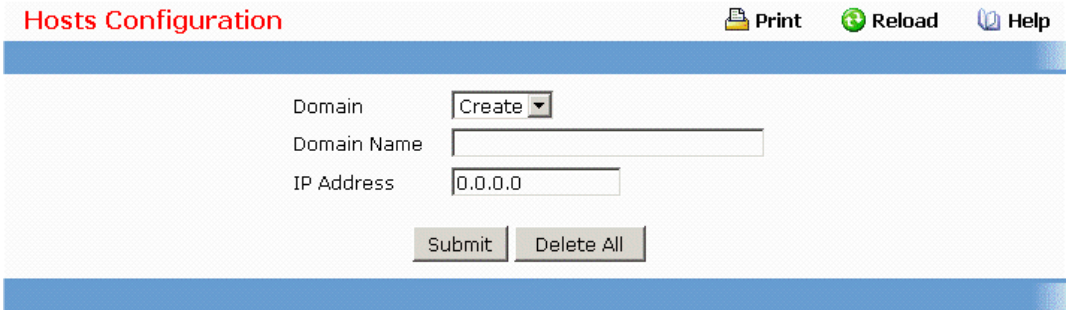

8.2.3.6 **Managing Routing Information Protocol (RIP)**

Configuring RIP Global Configuration Page

Configurable Data

RIP Admin Mode - Select enable or disable from the pulldown menu. If you select enable RIP will be enabled for the switch. The default is disabled.

Split Horizon Mode - Select none, simple or poison reverse from the pulldown menu. Split horizon is a technique for avoiding problems caused by including routes in updates sent to the router from which the route was originally learned. The options are:

None - no special processing for this case.

Simple - a route will not be included in updates sent to the router from which it was learned.

Poisoned reverse - a route will be included in updates sent to the router from which it was learned, but the metric will be set to infinity.

The default is simple.

Auto Summary Mode - Select enable or disable from the pulldown menu. If you select enable groups of adjacent routes will be summarized into single entries, in order to reduce the total number of entries. The default is disabled.

Host Routes Select Mode - Select enable or disable from the pulldown menu. If you select enable the router will be accept host routes. The default is enabled.

Default Information Originate - Enable or Disable Default Route Advertise.

Default Metric - Sets a default for the metric of redistributed routes.This field displays the default metric if one has already been set or blank if not configured earlier. The valid values are (1 to 15)

Non-Configurable Data

Global Route Changes - The number of route changes made to the IP Route Database by RIP. This does not include the refresh of a route's age.

Global queries - The number of responses sent to RIP queries from other systems.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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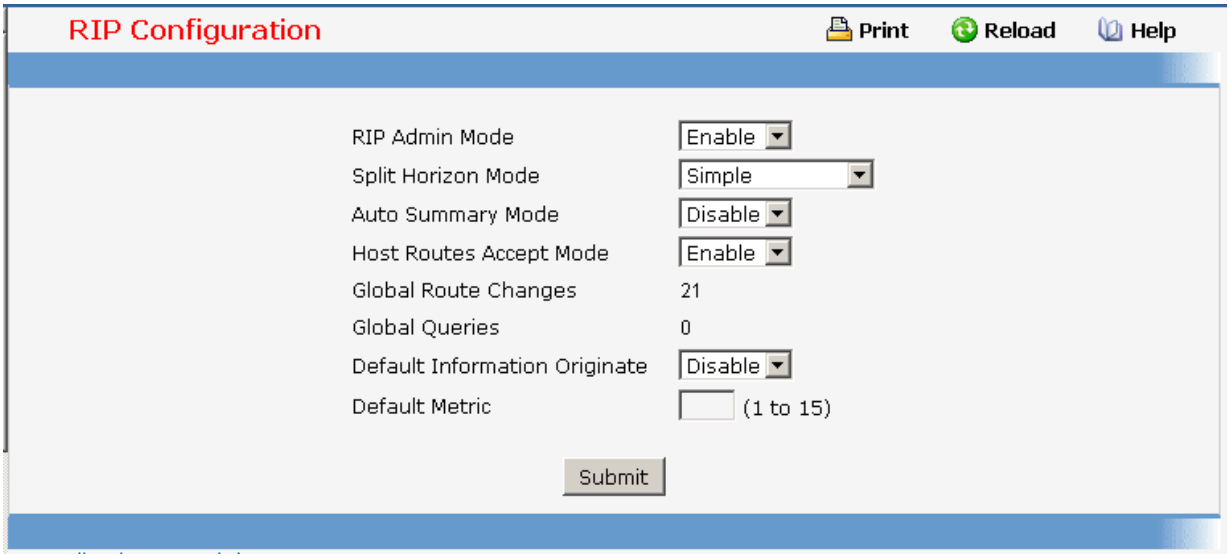

Viewing Each Routing Interface's RIP Configuration Page

Non-Configurable Data

Slot/Port - The slot and port for which the information is being displayed.

IP Address - The IP Address of the router interface.

Send Version - The RIP version to which RIP control packets sent from the interface conform. The value is one of the following:

RIP-1 - RIP version 1 packets will be sent using broadcast.

RIP-1c - RIP version 1 compatibility mode. RIP version 2 formatted packets will be transmitted using broadcast.

RIP-2 - RIP version 2 packets will be sent using multicast.

None - RIP control packets will not be transmitted.

The default is RIP-2.

Receive Version - Which RIP version control packets will be accepted by the interface. The value is one of the following:

RIP-1 - only RIP version 1 formatted packets will be received.

RIP-2 - only RIP version 2 formatted packets will be received.

Both - packets will be received in either format.

None - no RIP control packets will be received.

The default is Both.

RIP Admin Mode - Whether RIP is enabled or disabled on the interface.

Link State - Whether the RIP interface is up or down.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.

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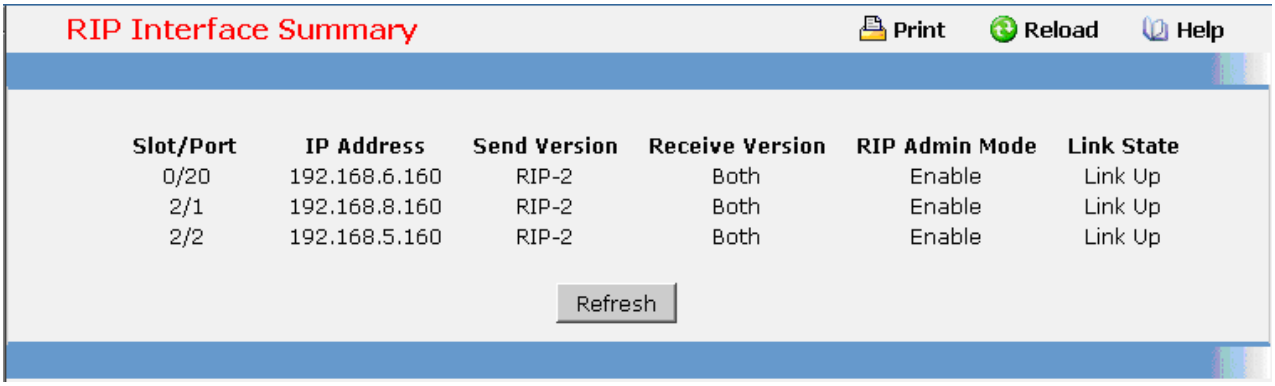

Defining The Routing Interface's RIP Configuration Page

Selection Criteria

Slot/Port - Select the interface for which data is to be configured.

Configurable Data

Send Version - Select the version of RIP control packets the interface should send from the pulldown menu. The value is one of the following:

RIP-1 - send RIP version 1 formatted packets via broadcast.

RIP-1c - RIP version 1 compatibility mode. Send RIP version 2 formatted packets via broadcast.

RIP-2 - send RIP version 2 packets using multicast.

None - no RIP control packets will be sent.

The default is RIP-2.

Receive Version - Select what RIP control packets the interface will accept from the pulldown menu. The value is one of the following:

RIP-1 - accept only RIP version 1 formatted packets.

RIP-2 - accept only RIP version 2 formatted packets.

Both - accept packets in either format.

None - no RIP control packets will be accepted.

The default is Both.

RIP Admin Mode - Select enable or disable from the pulldown menu. Before you enable RIP version 1 or version 1c on an interface, you must first enable network directed broadcast mode on the corresponding interface. The default value is disabled.

Authentication Type - You may select an authentication type other than none by clicking on the 'Configure Authentication' button. You will then see a new screen, where you can select the authentication type from the pulldown menu. The choices are:

None - This is the initial interface state. If you select this option from the pulldown menu on the second screen you will be returned to the first screen and no authentication protocols will be run.

Simple - If you select 'Simple' you will be prompted to enter an authentication key. This key will be included, in the clear, in the OSPF header of all packets sent on the network. All routers on the network must be configured with the same key.

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Encrypt - If you select 'Encrypt' you will be prompted to enter both an authentication key and an authentication ID. Encryption uses the MD5 Message-Digest algorithm. All routers on the network must be configured with the same key and ID.

Authentication Key - Enter the OSPF Authentication Key for the specified interface. If you do not choose to use authentication you will not be prompted to enter a key. If you choose 'simple' or 'encrypt' the key may be up to 16 octets long. The key value will only be displayed if you are logged on with Read/Write privileges, otherwise it will be displayed as asterisks.

Non-Configurable Data

IP Address - The IP Address of the router interface.

Link State - Indicates whether the RIP interface is up or down.

Bad Packets Received - The number of RIP response packets received by the RIP process which were subsequently discarded for any reason.

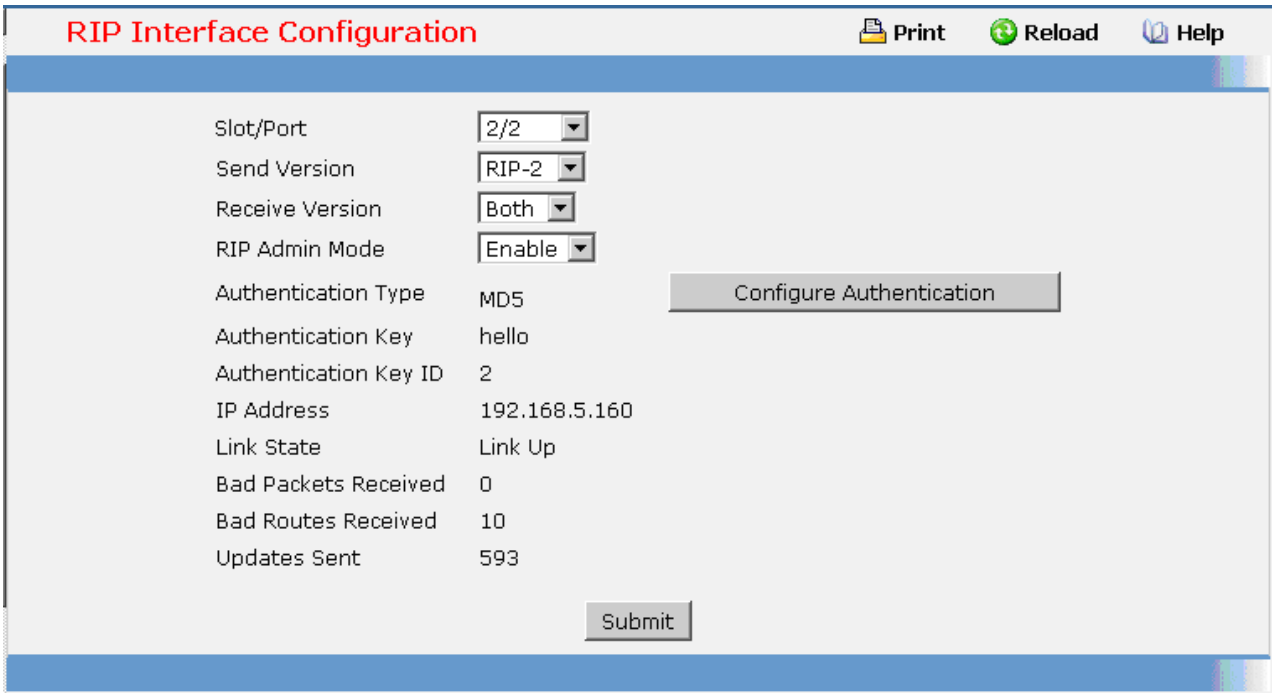
Bad Routes Received - The number of routes, in valid RIP packets, which were ignored for any reason (e.g. unknown address family, or invalid metric).

Updates Sent - The number of triggered RIP updates actually sent on this interface. This explicitly does NOT include full updates sent containing new information.

Command Buttons

Configure Authentication - Display a new screen where you can select the authentication method for the virtual link.

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed



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Configuring Route Redistribution Configuration

This screen can be used to configure the RIP Route Redistribution parameters. The allowable values for each field are displayed next to the field. If any invalid values are entered, an alert message will be displayed with the list of all the valid values.

Configurable Data

Configured Source - This select box is a dynamic selector and would be populated by only those Source Routes that have already been configured for redistribute by RIP. However, the topmost option in the select box would be "Create", and this allows the user to configure another, among the Available Source Routes. The valid values are 'Static', 'Connected', 'OSPF' and 'Create'.

Available Source - This select box is a dynamic selector and would be populated by only those Source Routes that have not previously been configured for redistribution by RIP. This select box would appear only if the user selects "Create" option as Configured Source. The valid values are 'Static', 'Connected', and 'OSPF'.

Metric- Sets the metric value to be used as the metric of redistributed routes. This field displays the metric if the source was pre-configured and can be modified. The valid values are (1 to 15)

Match - One or more of these checkboxes must be selected to set the type of OSPF routes to be redistributed. This field would appear only if Source is "OSPF". This field displays the configured match options if "OSPF" was pre-configured and can be modified.

Internal - Sets Internal OSPF Routes to be redistributed

External 1 - Sets External Type 1 OSPF Routes to be redistributed

External 2 - Sets External Type 2 OSPF Routes to be redistributed

NSSA-External 1 - Sets NSSA External Type 1 OSPF Routes to be redistributed

NSSA-External 2 - Sets NSSA External Type 2 OSPF Routes to be redistributed

The default is Internal.

Distribute List - Distribute List - Sets the Access List that filters the routes to be redistributed by the destination protocol. Only permitted routes are redistributed. If this command refers to a non-existent access list, all routes are permitted. The valid values for Access List IDs are (1 to 199). When used for route filtering, the only fields in an access list that get used are

Source IP Address and netmask

Destination IP Address and netmask

Action (permit or deny)

All other fields (source and destination port, precedence, tos, etc.) are ignored.
The source IP address is compared to the destination IP address of the route. The source IP netmask in the access list rule is treated as a wildcard mask, indicating which bits in the source IP address must match the destination address of the route. (Note that a 1 in the mask indicates a "don't care" in the corresponding address bit.)
When an access list rule includes a destination IP address and netmask (an extended access list), the destination IP address is compared to the network mask of the destination of the route. The destination netmask in the access list serves as a wildcard mask, indicating which bits in the route's destination mask are significant for the filtering operation.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately.

Delete - Delete the entry of the Source Route selected as Configured Source from the list of Sources configured for RIP Route Redistribution.

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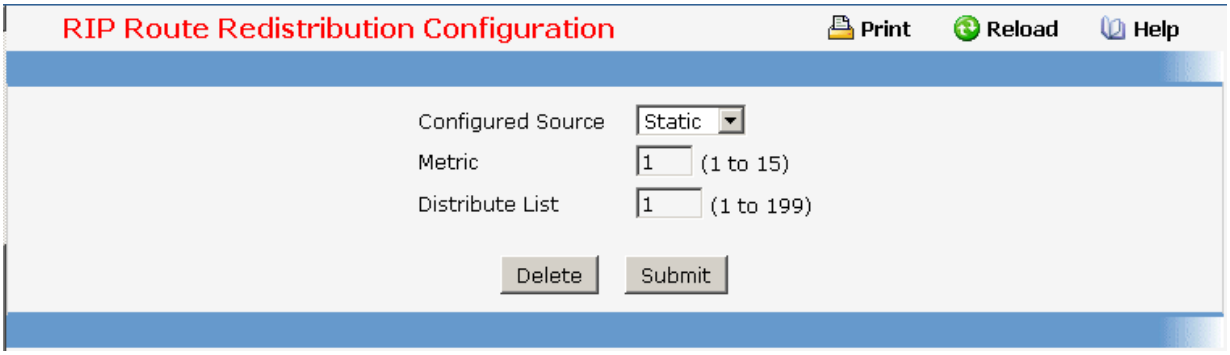

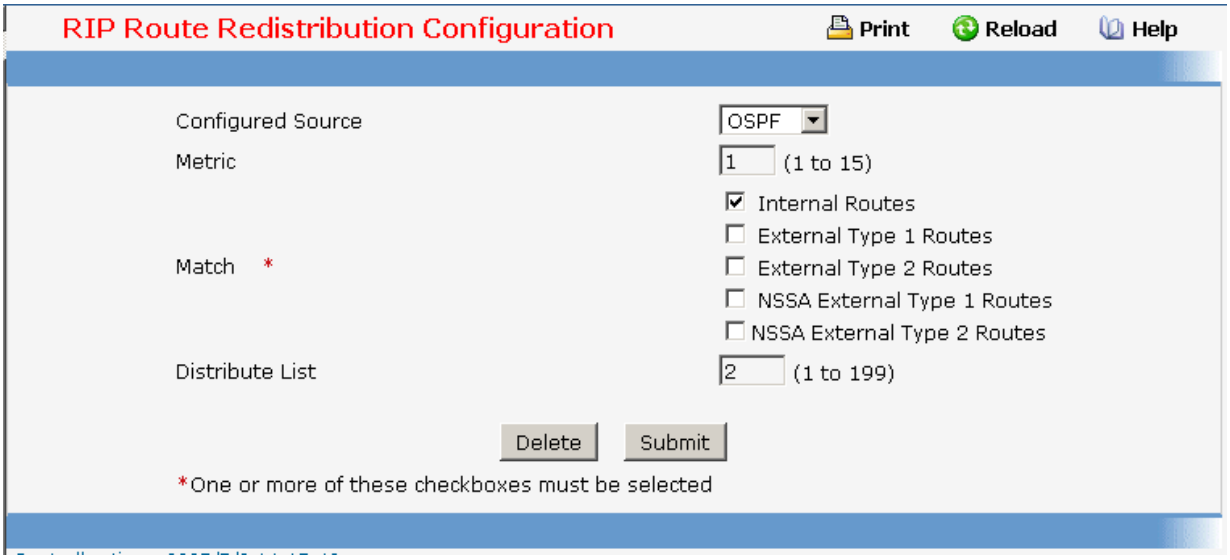

Viewing Route Redistribution Configuration

This screen displays the RIP Route Redistribution Configurations.

Non Configurable Data

Source - The Source Route to be Redistributed by RIP.

Metric- The Metric of redistributed routes for the given Source Route. Displays "Unconfigured" when not configured.

Match - List of Routes redistributed when "OSPF" is selected as Source. The list may include one or more of:

Internal

External 1

External 2

NSSA-External 1

NSSA-External 2

Distribute List - The Access List that filters the routes to be redistributed by the Destination Protocol. Displays 0 when not configured.

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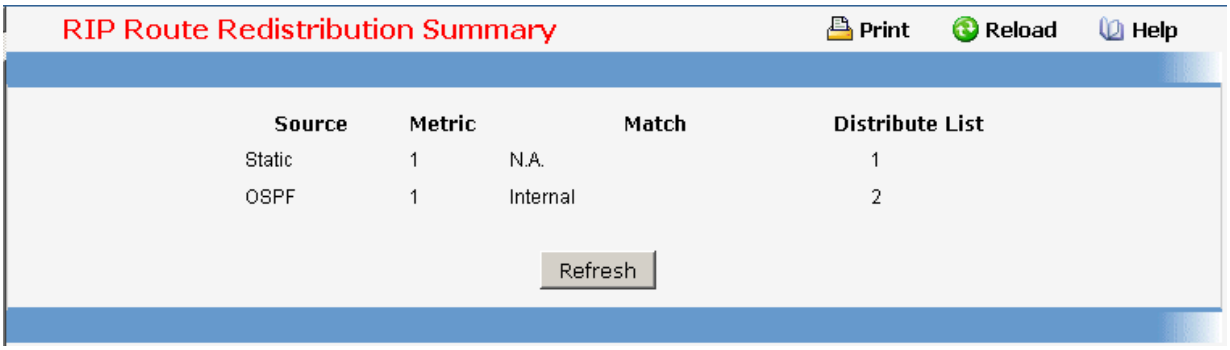
Command Buttons

Refresh - Displays the latest RIP Route Redistribution Configuration data.



8.2.3.7 **Managing Router Discovery**

Configuring Router Discovery

Selection Criteria

Slot/Port - Select the router interface for which data is to be configured.

Configurable Data

Advertise Mode - Select enable or disable from the pulldown menu. If you select enable, Router Advertisements will be transmitted from the selected interface.

Advertise Address - Enter the IP Address to be used to advertise the router.

Maximum Advertise Interval - Enter the maximum time (in seconds) allowed between router advertisements sent from the interface.

Minimum Advertise Interval - Enter the minimum time (in seconds) allowed between router advertisements sent from the interface.

Advertise Lifetime - Enter the value (in seconds) to be used as the lifetime field in router advertisements sent from the interface. This is the maximum length of time that the advertised addresses are to be considered as valid router addresses by hosts.

Preference Level - Specify the preference level of the router as a default router relative to other routers on the same subnet. Higher numbered addresses are preferred. You must enter an integer.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. The changes will not be retained across a power cycle unless a save is performed.

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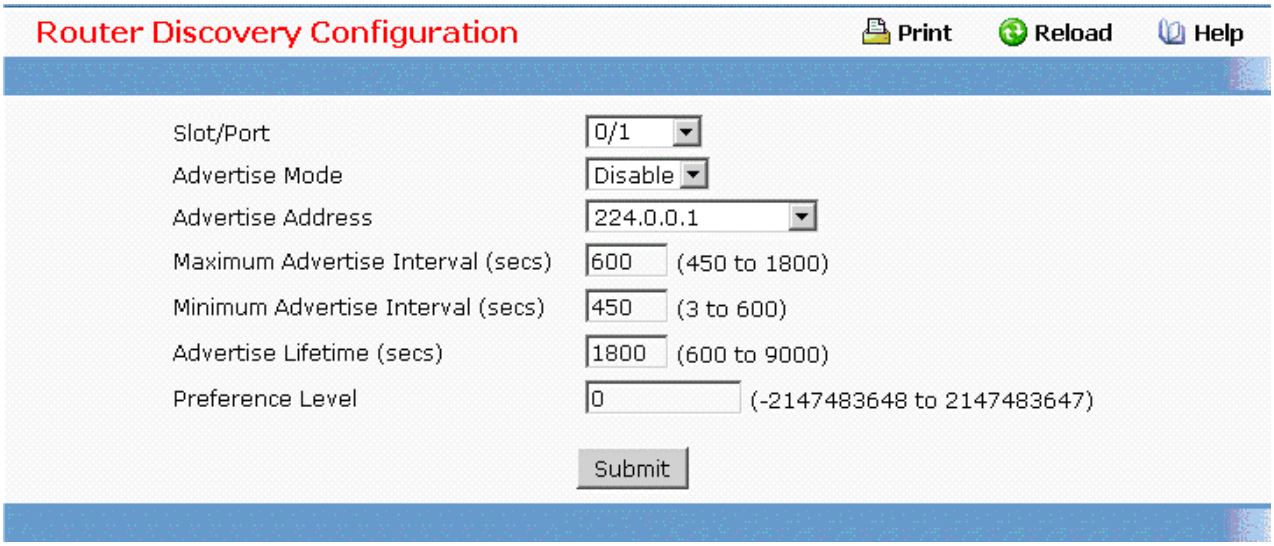

Viewing Router Discovery Status

Non-Configurable Data

Slot/Port - The router interface for which data is displayed.

Advertise Mode - The values are enable or disable. Enable denotes that Router Discovery is enabled on that interface.

Advertise Address - The IP Address used to advertise the router.

Maximum Advertise Interval - The maximum time (in seconds) allowed between router advertisements sent from the interface.

Minimum Advertise Interval - The minimum time (in seconds) allowed between router advertisements sent from the interface.

Advertise Lifetime - The value (in seconds) used as the lifetime field in router advertisements sent from the interface. This is the maximum length of time that the advertised addresses are to be considered as valid router addresses by hosts.

Preference Level - The preference level of the router as a default router relative to other routers on the same subnet. Higher numbered addresses are preferred.

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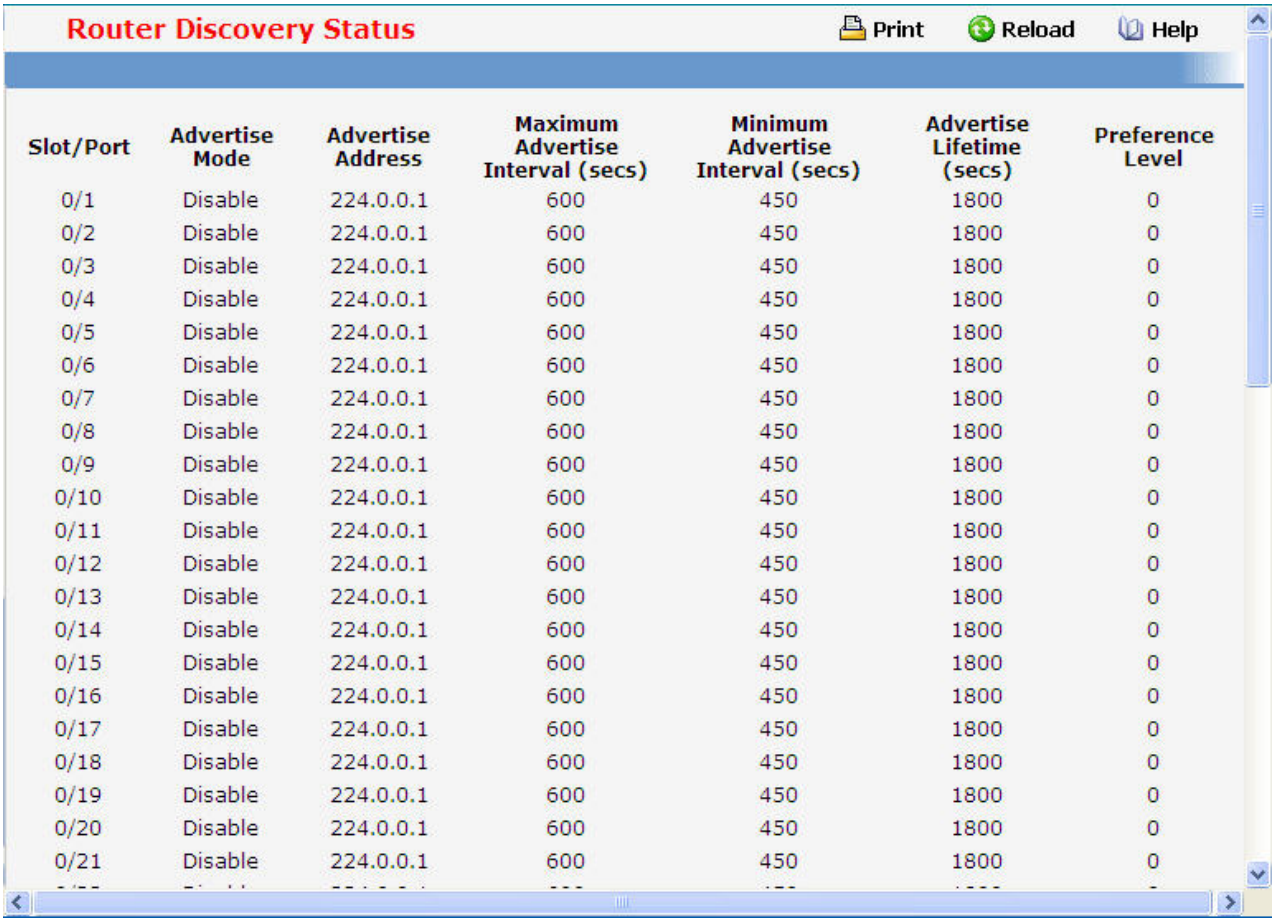

Slot/Port	Advertise Mode	Advertise Address	Maximum Advertise Interval (secs)	Minimum Advertise Interval (secs)	Advertise Lifetime (secs)	Preference Level
0/1	Disable	224.0.0.1	600	450	1800	0
0/2	Disable	224.0.0.1	600	450	1800	0
0/3	Disable	224.0.0.1	600	450	1800	0
0/4	Disable	224.0.0.1	600	450	1800	0
0/5	Disable	224.0.0.1	600	450	1800	0
0/6	Disable	224.0.0.1	600	450	1800	0
0/7	Disable	224.0.0.1	600	450	1800	0
0/8	Disable	224.0.0.1	600	450	1800	0
0/9	Disable	224.0.0.1	600	450	1800	0
0/10	Disable	224.0.0.1	600	450	1800	0
0/11	Disable	224.0.0.1	600	450	1800	0
0/12	Disable	224.0.0.1	600	450	1800	0
0/13	Disable	224.0.0.1	600	450	1800	0
0/14	Disable	224.0.0.1	600	450	1800	0
0/15	Disable	224.0.0.1	600	450	1800	0
0/16	Disable	224.0.0.1	600	450	1800	0
0/17	Disable	224.0.0.1	600	450	1800	0
0/18	Disable	224.0.0.1	600	450	1800	0
0/19	Disable	224.0.0.1	600	450	1800	0
0/20	Disable	224.0.0.1	600	450	1800	0
0/21	Disable	224.0.0.1	600	450	1800	0

8.2.3.8 **Managing Route Table**

Viewing Router Route Table

Non-Configurable Data

Network Address - The IP route prefix for the destination.

Subnet Mask - Also referred to as the subnet/network mask, this indicates the portion of the IP interface address that identifies the attached network.

Protocol - This field tells which protocol created the specified route. The possibilities are one of the following:

- ***Local***
- ***Static***
- ***Default***
- ***MPLS***
- ***OSPF Intra***
- ***OSPF Inter***

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- ***OSPF Type-1***
- ***OSPF Type-2***
- ***RIP***
- ***BGP4***

Next Hop Slot/Port - The outgoing router interface to use when forwarding traffic to the destination.

Next Hop IP Address - The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path towards the destination. The next router will always be one of the adjacent neighbors or the IP address of the local interface for a directly attached network.

Total Number of Routes - The total number of routes in the route table.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.

Viewing Router Best Route Table

Non-Configurable Data

Network Address - The IP route prefix for the destination.

Subnet Mask - Also referred to as the subnet/network mask, this indicates the portion of the IP interface address that identifies the attached network.

Protocol - This field tells which protocol created the specified route. The possibilities are one of the following:

- ***Local***
- ***Static***
- ***Default***
- ***MPLS***
- ***OSPF Intra***
- ***OSPF Inter***
- ***OSPF Type-1***

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- ***OSPF Type-2***
- ***RIP***
- ***BGP4***

Next Hop Slot/Port - The outgoing router interface to use when forwarding traffic to the destination.

Next Hop IP Address - The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path towards the destination. The next router will always be one of the adjacent neighbors or the IP address of the local interface for a directly attached network.

Total Number of Routes - The total number of routes in the route table.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.

Configuring Router Static Route Entry

Selection Criteria

Network Address - Specifies the IP route prefix for the destination. In order to create a route a valid routing interface must exist and the next hop IP Address must be on the same network as the routing interface. Routing interfaces are created on the IP Interface Configuration page. Valid next hop IP Addresses can be viewed on the 'Route Table' screen.

Route Type - This field can be either default or static. If creating a default route, all that needs to be specified is the next hop IP address, otherwise each field needs to be specified.

Non-Configurable Data

Subnet Mask - Also referred to as the subnet/network mask, this indicates the portion of the IP interface address that identifies the attached network.

Protocol - This field tells which protocol created the specified route. The possibilities are one of the following:

- ***Static***
- ***Default***
- ***MPLS***

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- ***OSPF Intra***
- ***OSPF Inter***
- ***OSPF Type-1***
- ***OSPF Type-2***
- ***RIP***
- ***BGP4Local***

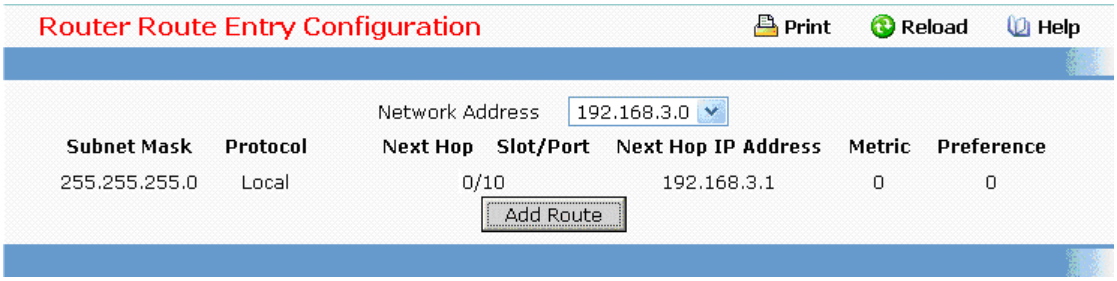
Next Hop Slot/Port - The outgoing router interface to use when forwarding traffic to the destination.

Next Hop IP Address - The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path towards the destination. The next router will always be one of the adjacent neighbors or the IP address of the local interface for a directly attached network. When creating a route, the next hop IP must be on the same network as the routing interface. Valid next hop IP Addresses can be seen on the 'Route Table' page.

Metric - Administrative cost of the path to the destination. If no value is entered, default is 1. The range is 0 - 255.

Command Buttons

Add Route - Go to a separate page where a route can be created.



Configuring Router Static Route Entry

Selection Criteria

Route Type - This field can be either default or static. If creating a default route, all that needs to be specified is the next hop IP address, otherwise each field needs to be specified.

Non-Configurable Data

Network Address - The IP route prefix for the destination.

Subnet Mask - Also referred to as the subnet/network mask, this indicates the portion of the IP interface address that identifies the attached network.

Next Hop IP Address - The outgoing router IP address to use when forwarding traffic to the next router (if any) in the path towards the destination. The next router will always be one of the adjacent neighbors or the IP address of the local interface for a directly attached network.

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Preference - Specifies a preference value for the configured next hop.

Command Buttons

Add Route - Go to a separate page where a route can be created.

Configuring Router Route Preference

Use this panel to configure the default preference for each protocol (e.g. 60 for static routes, 170 for BGP). These values are arbitrary values in the range of 1 to 255 and are independent of route metrics. Most routing protocols use a route metric to determine the shortest path known to the protocol, independent of any other protocol.

The best route to a destination is chosen by selecting the route with the lowest preference value. When there are multiple routes to a destination, the preference values are used to determine the preferred route. If there is still a tie, the route with the best route metric will be chosen. To avoid problems with mismatched metrics (i.e. RIP and OSPF metrics are not directly comparable) you must configure different preference values for each of the protocols.

Configurable Data

Static - The static route preference value in the router. The default value is 1. The range is 1 to 255.

OSPF Intra - The OSPF intra route preference value in the router. The default value is 8. The range is 1 to 255. The OSPF specification (RFC 2328) requires that preferences must be given to the routes learned via OSPF in the following order: intra < inter < type-1 < type-2.

OSPF Inter - The OSPF inter route preference value in the router. The default value is 10. The range is 1 to 255. The OSPF specification (RFC 2328) requires that preferences must be given to the routes learned via OSPF in the following order: intra < inter < type-1 < type-2.

OSPF Type-1 - The OSPF type-1 route preference value in the router. The default value is 13. The range is 1 to 255. The OSPF specification (RFC 2328) requires that preferences must be given to the routes learned via OSPF in the following order: intra < inter < type-1 < type-2.

OSPF Type-2 - The OSPF type-2 route preference value in the router. The default value is 150. The range is 1 to 255. The OSPF specification (RFC 2328) requires that preferences must be given to the routes learned via OSPF in the following order: intra < inter < type-1 < type-2.

RIP - The RIP route preference value in the router. The default value is 15. The range is 1 to 255.

Non-Configurable Data

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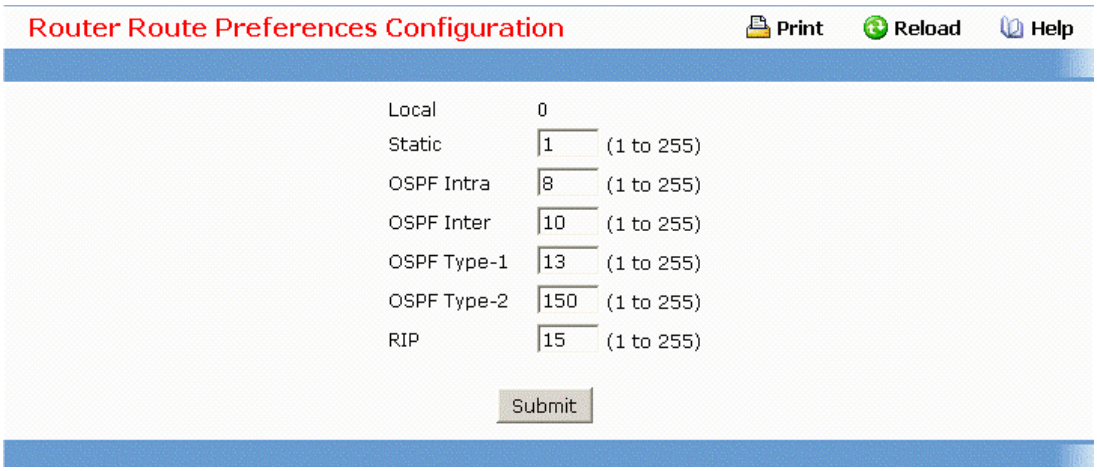
Local - This field displays the local route preference value.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



8.2.3.9 **Managing VLAN Routing**

Configuring VLAN Routing

Selection Criteria

VLAN ID - Enter the ID of a VLAN you want to configure for VLAN Routing. Initially, the field will display the ID of the first VLAN. After you enter a new VLAN ID and click on the Create button the non-configurable data will be displayed. See below for detailed instructions on how to use that data to complete the configuration of the VLAN.

Non-Configurable Data

Slot/Port - The interface assigned to the VLAN for routing.

MAC Address - The MAC Address assigned to the VLAN Routing Interface

Command Buttons

Create - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Remove the VLAN Routing Interface specified in the *VLAN ID input field* from the router configuration.

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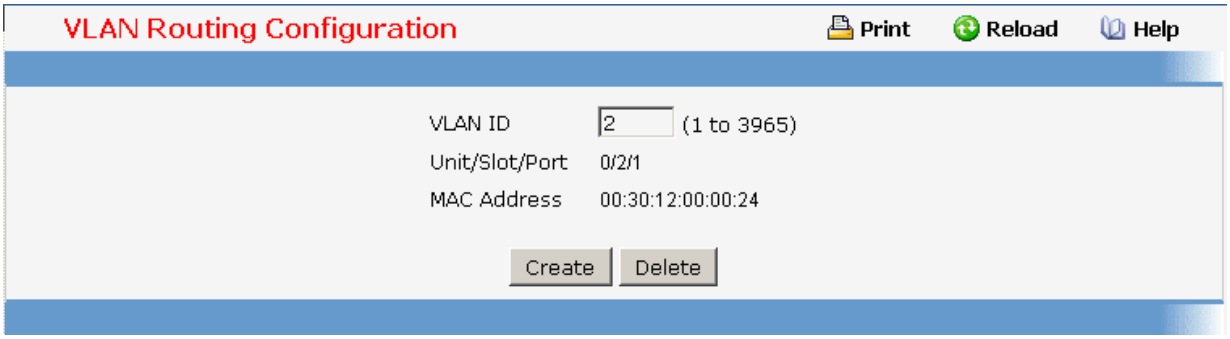
Instructions for creating a VLAN

- Enter a new VLAN ID in the field labeled VLAN ID.
- Click on the Create button. The page will be updated to display the interface and MAC address assigned to this new VLAN. The IP address and Subnet Mask fields will be 0.0.0.0.
- Note the interface assigned to the VLAN.
- Use the index pane to change to the IP Interface Configuration page.
- Select the interface assigned to the VLAN. The IP address and Subnet Mask fields will be 0.0.0.0.
- Enter the IP address and subnet mask for the VLAN.
- Select the Submit button.
- Change back to the VLAN Routing Summary page. The new VLAN should appear in the table with the correct IP address and subnet mask assigned.



Viewing VLAN Routing Summary Information

Non-Configurable Data

VLAN ID - The ID of the VLAN whose data is displayed in the current table row

Slot/Port - The Slot/Port assigned to the VLAN Routing Interface

MAC Address - The MAC Address assigned to the VLAN Routing Interface

IP Address - The configured IP Address of the VLAN Routing Interface. This will be 0.0.0.0 when the VLAN Routing Interface is first configured and must be entered on the IP Interface Configuration page.

Subnet Mask - The configured Subnet Mask of the VLAN Routing Interface. This will be 0.0.0.0 when the VLAN Routing Interface is first configured and must be entered on the IP Interface Configuration page.

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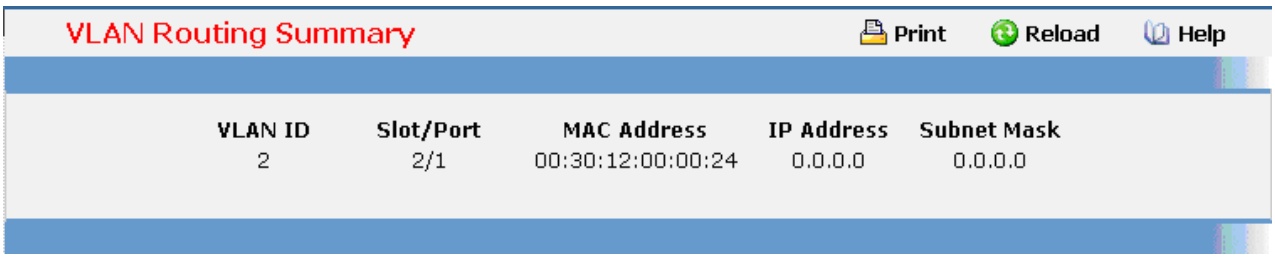


8.2.3.10 **Managing VRRP**

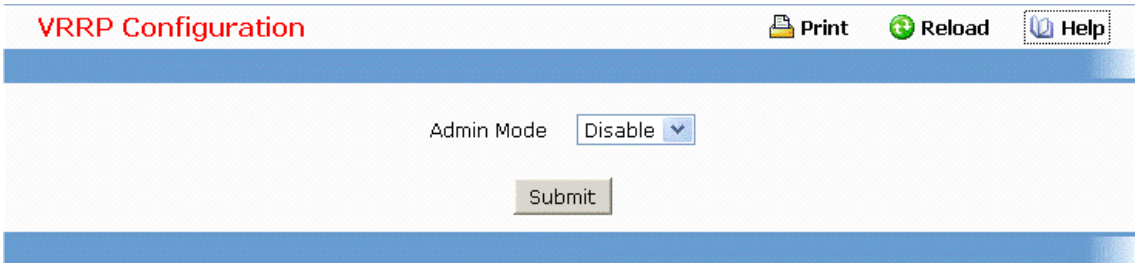
Configuring VRRP

Configurable Data

VRRP Admin Mode - This sets the administrative status of VRRP in the router to active or inactive. Select enable or disable from the pulldown menu. The default is disable.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Configuring Virtual Router

Selection Criteria

VRID and Slot/Port - Select 'Create' from the pulldown menu to configure a new Virtual Router, or select one of the existing Virtual Routers, listed by interface number and VRID.

Configurable Data

VRID - This field is only configurable if you are creating new Virtual Router, in which case enter the VRID in the range 1 to 255 .

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Slot/Port - This field is only configurable if you are creating new Virtual Router, in which case select the Slot/Port for the new Virtual Router from the pulldown menu.

Pre-empt Mode - Select enable or disable from the pulldown menu. If you select enable a backup router will preempt the master router if it has a priority greater than the master virtual router's priority provided the master is not the owner of the virtual router IP address. The default is enable.

Priority - Enter the priority value to be used by the VRRP router in the election for the master virtual router. If the Virtual IP Address is the same as the interface IP Address, the priority gets set to 255 no matter what the user enters. If the user enters a priority of 255 when the Virtual and interface IP Addresses are not the same, the priority gets set to the default value of 100.

Advertisement Interval - Enter the time, in seconds, between the transmission of advertisement packets by this virtual router. Enter a number between 1 and 255. The default value is 1 second.

IP Address - Enter the IP Address associated with the Virtual Router. The default is 0.0.0.0.

Authentication Type - Select the type of Authentication for the Virtual Router from the pulldown menu. The default is None. The choices are:

- ***0-None*** - No authentication will be performed.
- ***1-Key*** - Authentication will be performed using a text password.

Authentication Data - If you selected simple authentication, enter the password.

Status - Select active or inactive from the pulldown menu to start or stop the operation of the Virtual Router. The default is inactive.

Non-Configurable Data

Interface IP Address - Indicates the IP Address associated with the selected interface.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Delete the selected Virtual Router. Note that the router can not be deleted if there are secondary addresses configured.

Secondary IP Address - Proceed to the Secondary IP Address configuration screen.

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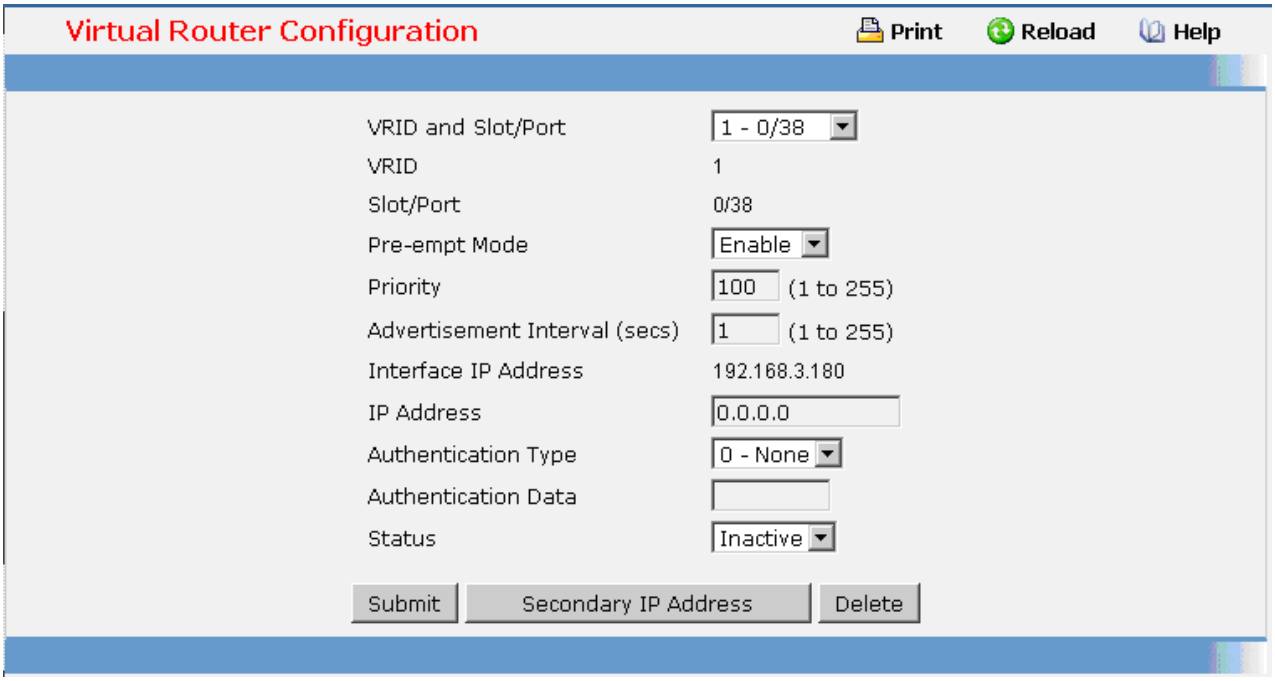

Viewing Virtual Router Status

Non-Configurable Data

VRID - Virtual Router Identifier.

Slot/Port - Indicates the interface associate with the VRID.

Priority - The priority value used by the VRRP router in the election for the master virtual router.

Pre-empt Mode -

- ***Enable*** - if the Virtual Router is a backup router it will preempt the master router if it has a priority greater than the master virtual router's priority provided the master is not the owner of the virtual router IP address.
- ***Disable*** - if the Virtual Router is a backup router it will not preempt the master router even if its priority is greater.

Advertisement Interval - the time, in seconds, between the transmission of advertisement packets by this virtual router.

Virtual IP Address - The IP Address associated with the Virtual Router.

Interface IP Address - The actual IP Address associated with the interface used by the Virtual Router.

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Owner - Set to 'True' if the Virtual IP Address and the Interface IP Address are the same, otherwise set to 'False'. If this parameter is set to 'True', the Virtual Router is the owner of the Virtual IP Address, and will always win an election for master router when it is active.

VMAC Address - The virtual MAC Address associated with the Virtual Router, composed of a 24 bit organizationally unique identifier, the 16 bit constant identifying the VRRP address block and the 8 bit VRID.

Auth Type - The type of authentication in use for the Virtual Router

- ***None***
- ***Simple***

State - The current state of the Virtual Router:

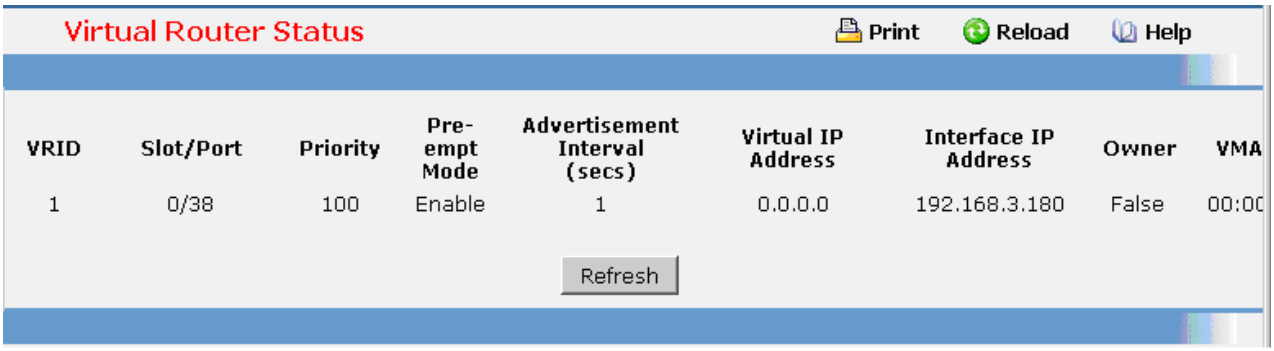
- ***Initialize***
- ***Master***
- ***Backup***

Status - The current status of the Virtual Router:

- ***Inactive***
- ***Active***

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the switch.



Viewing Virtual Router Statistics

Selection Criteria

VRID and Slot/Port - Select the existing Virtual Router, listed by interface number and VRID, for which you want to display statistical information.

Non-Configurable Data

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Router Checksum Errors - The total number of VRRP packets received with an invalid VRRP checksum value.

Router Version Errors - The total number of VRRP packets received with an unknown or unsupported version number.

Router VRID Errors - The total number of VRRP packets received with an invalid VRID for this virtual router.

VRID - the VRID for the selected Virtual Router.

Slot/Port - The Slot/Port for the selected Virtual Router.

Up Time - The time, in days, hours, minutes and seconds, that has elapsed since the virtual router transitioned to the initialized state.

State Transitioned to Master - The total number of times that this virtual router's state has transitioned to Master.

Advertisement Received - The total number of VRRP advertisements received by this virtual router.

Advertisement Interval Errors - The total number of VRRP advertisement packets received for which the advertisement interval was different than the one configured for the local virtual router .

Authentication Failure - The total number of VRRP packets received that did not pass the authentication check.

IP TTL Errors - The total number of VRRP packets received by the virtual router with IP TTL (Time-To-Live) not equal to 255.

Zero Priority Packets Received - The total number of VRRP packets received by the virtual router with a priority of '0'.

Zero Priority Packets Sent - The total number of VRRP packets sent by the virtual router with a priority of '0'.

Invalid Type Packets Received - The number of VRRP packets received by the virtual router with an invalid value in the 'type' field.

Address List Errors - The total number of packets received for which the address list does not match the locally configured list for the virtual router.

Invalid Authentication Type - The total number of packets received with an unknown authentication type.

Authentication Type Mismatch - The total number of packets received with an authentication type different to the locally configured authentication method.

Packet Length Errors - The total number of packets received with a packet length less than the length of the VRRP header.

Command Buttons

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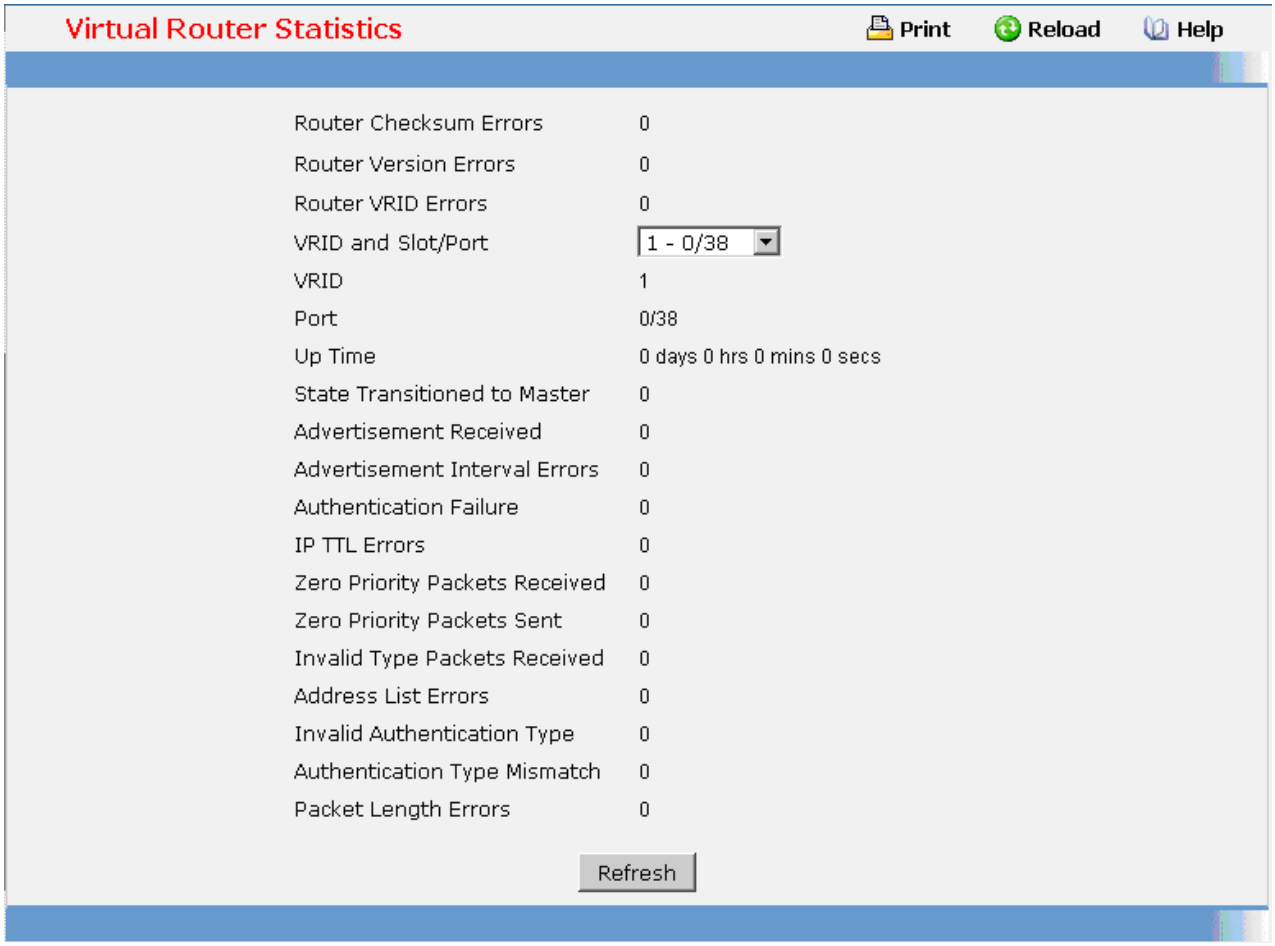
Refresh - Refresh the data on the screen with the present state of the data in the switch.



8.2.4 *Security Menu*

8.2.4.1 **Managing Access Control (802.1x)**

Defining Access Control Page

Configurable Data

Administrative Mode - This selector lists the two options for administrative mode: enable and disable. The default value is disabled.

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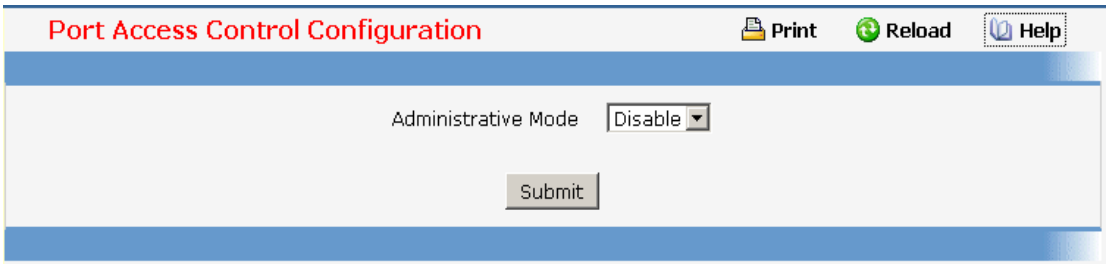
Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.



Configuring each Port Access Control Configuration Page

Selection Criteria

Port - Selects the port to be configured. When the selection is changed, a screen refresh will occur causing all fields to be updated for the newly selected port. All physical interfaces are valid.

Configurable Data

Control Mode - This selector lists the options for control mode. The control mode is only set if the link status of the port is link up. The options are:

force unauthorized: The authenticator port access entity (PAE) unconditionally sets the controlled port to unauthorized

force authorized: The authenticator PAE unconditionally sets the controlled port to authorized.

auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Quiet Period - This input field allows the user to configure the quiet period for the selected port. This command sets the value, in seconds, of the timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The quiet period is the period for which the authenticator does not attempt to acquire a supplicant after a failed authentication exchange with the supplicant. The quiet period must be a number in the range of 0 and 65535. A quiet period value of 0 means that the authenticator state machine will never acquire a supplicant. The default value is 60. Changing the value will not change the configuration until the Submit button is pressed.

Transmit Period - This input field allows the user to configure the transmit period for the selected port. The transmit period is the value, in seconds, of the timer used by the authenticator state machine on the specified port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The transmit period must be a number in the range of 1 to 65535. The default value is 30. Changing the value will not change the configuration until the Submit button is pressed.

Supplicant Timeout - This input field allows the user to enter the supplicant timeout for the selected port. The supplicant timeout is the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the supplicant. The supplicant timeout must be a value in the range of 1 to 65535. The default value is 30. Changing the value will not change the configuration until the Submit button is pressed.

Server Timeout - This input field allows the user to enter the server timeout for the selected port. The server timeout is the value, in seconds, of the timer used by the authenticator on this port to timeout the authentication server. The server timeout must be a value in the range of 1 to 65535. The default value is 30. Changing the value will not change the configuration until the Submit button is pressed.

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Maximum Requests - This input field allows the user to enter the maximum requests for the selected port. The maximum requests value is the maximum number of times the authenticator state machine on this port will retransmit an EAPOL EAP Request/Identity before timing out the supplicant. The maximum requests value must be in the range of 1 to 10. The default value is 2. Changing the value will not change the configuration until the Submit button is pressed.

Reauthentication Period - This input field allows the user to enter the reauthentication period for the selected port. The reauthentication period is the value, in seconds, of the timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The reauthentication period must be a value in the range of 1 to 65535. The default value is 3600. Changing the value will not change the configuration until the Submit button is pressed.

Reauthentication Enabled - This field allows the user to enable or disable reauthentication of the supplicant for the specified port. The selectable values are 'true' and 'false'. If the value is 'true' reauthentication will occur. Otherwise, reauthentication will not be allowed. The default value is false. Changing the selection will not change the configuration until the Submit button is pressed.

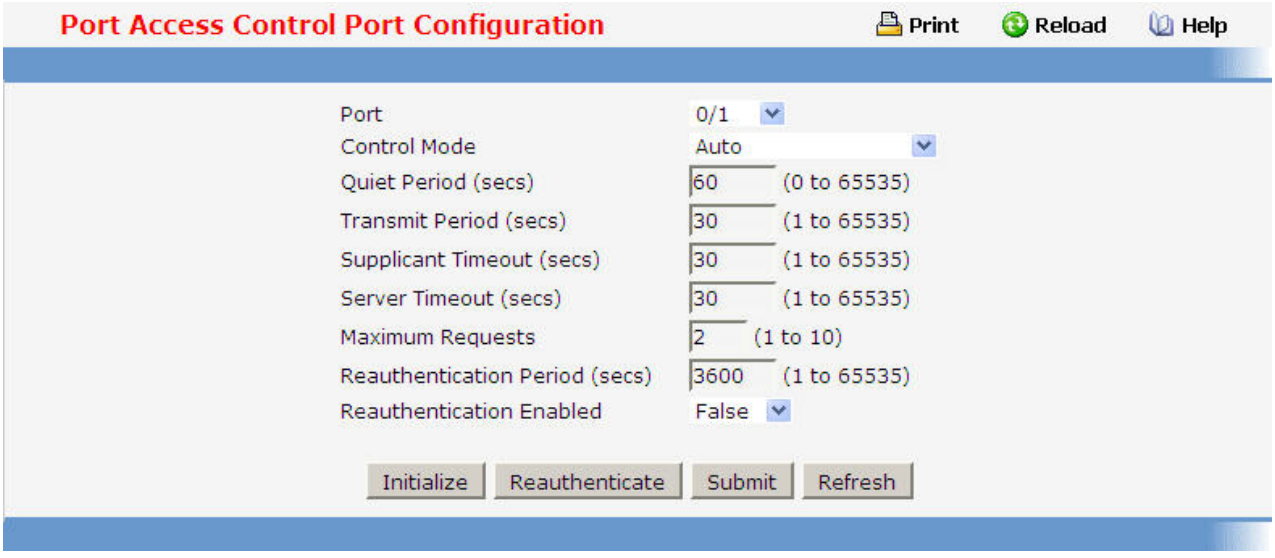
Command Buttons

Initialize - This button begins the initialization sequence on the selected port. This button is only selectable if the control mode is 'auto'. If the button is not selectable, it will be grayed out. Once this button is pressed, the action is immediate. It is not required to press the Submit button for the action to occur.

Reauthenticate - This button begins the reauthentication sequence on the selected port. This button is only selectable if the control mode is 'auto'. If the button is not selectable, it will be grayed out. Once this button is pressed, the action is immediate. It is not required to press the Submit button for the action to occur.

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.



Viewing each Port Access Control Configuration Information Page

Selection Criteria

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Port - Selects the port to be displayed. When the selection is changed, a screen refresh will occur causing all fields to be updated for the newly selected port. All physical interfaces are valid.

Non-Configurable Data

Control Mode - Displays the configured control mode for the specified port. Options are:

force unauthorized: The authenticator port access entity (PAE) unconditionally sets the controlled port to unauthorized

force authorized: The authenticator PAE unconditionally sets the controlled port to authorized.

auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Quiet Period - This field displays the configured quiet period for the selected port. This quiet period is the value, in seconds, of the timer used by the authenticator state machine on this port to define periods of time in which it will not attempt to acquire a supplicant. The quiet period is the period for which the authenticator does not attempt to acquire a supplicant after a failed authentication exchange with the supplicant. The quiet period is a number in the range of 0 and 65535.

Transmit Period - This field displays the configured transmit period for the selected port. The transmit period is the value, in seconds, of the timer used by the authenticator state machine on the specified port to determine when to send an EAPOL EAP Request/Identity frame to the supplicant. The transmit period is a number in the range of 1 to 65535.

Supplicant Timeout - This field displays the configured supplicant timeout for the selected port. The supplicant timeout is the value, in seconds, of the timer used by the authenticator state machine on this port to timeout the supplicant. The supplicant timeout is a value in the range of 1 to 65535.

Server Timeout - This field displays the configured server timeout for the selected port. The server timeout is the value, in seconds, of the timer used by the authenticator on this port to timeout the authentication server. The server timeout is a value in the range of 1 to 65535.

Maximum Requests - This field displays the configured maximum requests for the selected port. The maximum requests value is the maximum number of times the authenticator state machine on this port will retransmit an EAPOL EAP Request/Identity before timing out the supplicant. The maximum requests value is in the range of 1 to 10.

Reauthentication Period - This field displays the configured reauthentication period for the selected port. The reauthentication period is the value, in seconds, of the timer used by the authenticator state machine on this port to determine when reauthentication of the supplicant takes place. The reauthentication period is a value in the range of 1 to 65535.

Reauthentication Enabled - This field displays if reauthentication is enabled on the selected port. This is a configurable field. The possible values are 'true' and 'false'. If the value is 'true' reauthentication will occur. Otherwise, reauthentication will not be allowed.

Control Direction - This displays the control direction for the specified port. The control direction dictates the degree to which protocol exchanges take place between Supplicant and Authenticator. This affects whether the unauthorized controlled port exerts control over communication in both directions (disabling both incoming and outgoing frames) or just in the incoming direction (disabling only the reception of incoming frames). This field is not configurable on some platforms.

Protocol Version - This field displays the protocol version associated with the selected port. The only possible value is 1, corresponding to the first version of the 802.1x specification. This field is not configurable.

PAE Capabilities - This field displays the port access entity (PAE) functionality of the selected port. Possible values are "Authenticator" or "Supplicant". This field is not configurable.

Authenticator PAE State - This field displays the current state of the authenticator PAE state machine. Possible values are:

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"Initialize"

"Disconnected"

"Connecting"

"Authenticating"

"Authenticated"

"Aborting"

"Held"

"ForceAuthorized"

"ForceUnauthorized".

Backend State - This field displays the current state of the backend authentication state machine. Possible values are:

"Request"

"Response"

"Success"

"Fail"

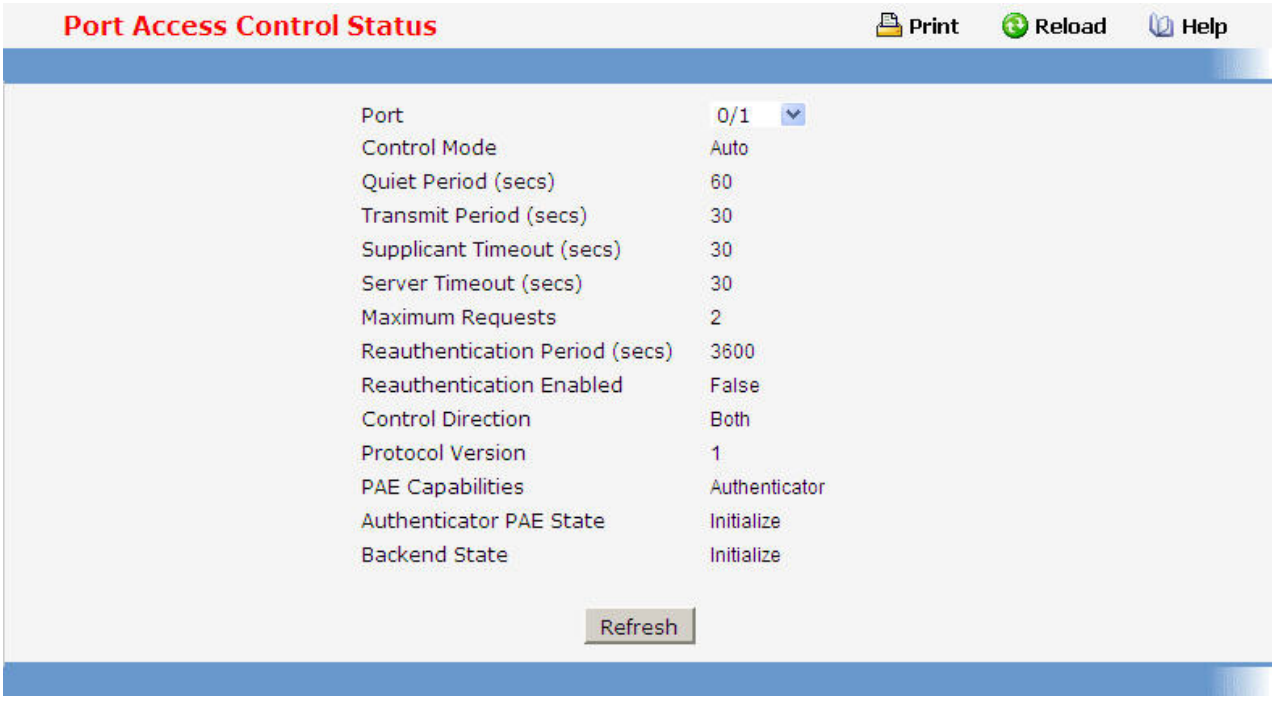
"Timeout"

"Initialize"

"Idle"

Command Buttons

Refresh - Update the information on the page.



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Viewing Access Control Summary Page

Non-Configurable Data

Port - Specifies the port whose settings are displayed in the current table row.

Control Mode - This field indicates the configured control mode for the port. Possible values are:

Force Unauthorized: The authenticator port access entity (PAE) unconditionally sets the controlled port to unauthorized.

Force Authorized: The authenticator PAE unconditionally sets the controlled port to authorized.

Auto: The authenticator PAE sets the controlled port mode to reflect the outcome of the authentication exchanges between the supplicant, authenticator, and the authentication server.

Operating Control Mode - This field indicates the control mode under which the port is actually operating. Possible values are:

ForceUnauthorized

ForceAuthorized

Auto

Reauthentication Enabled - This field shows whether reauthentication of the supplicant for the specified port is allowed. The possible values are 'true' and 'false'. If the value is 'true' reauthentication will occur. Otherwise, reauthentication will not be allowed.

Port Status - This field shows the authorization status of the specified port. The possible values are 'Authorized' and 'Unauthorized'.

Command Buttons

Refresh - Update the information on the page.

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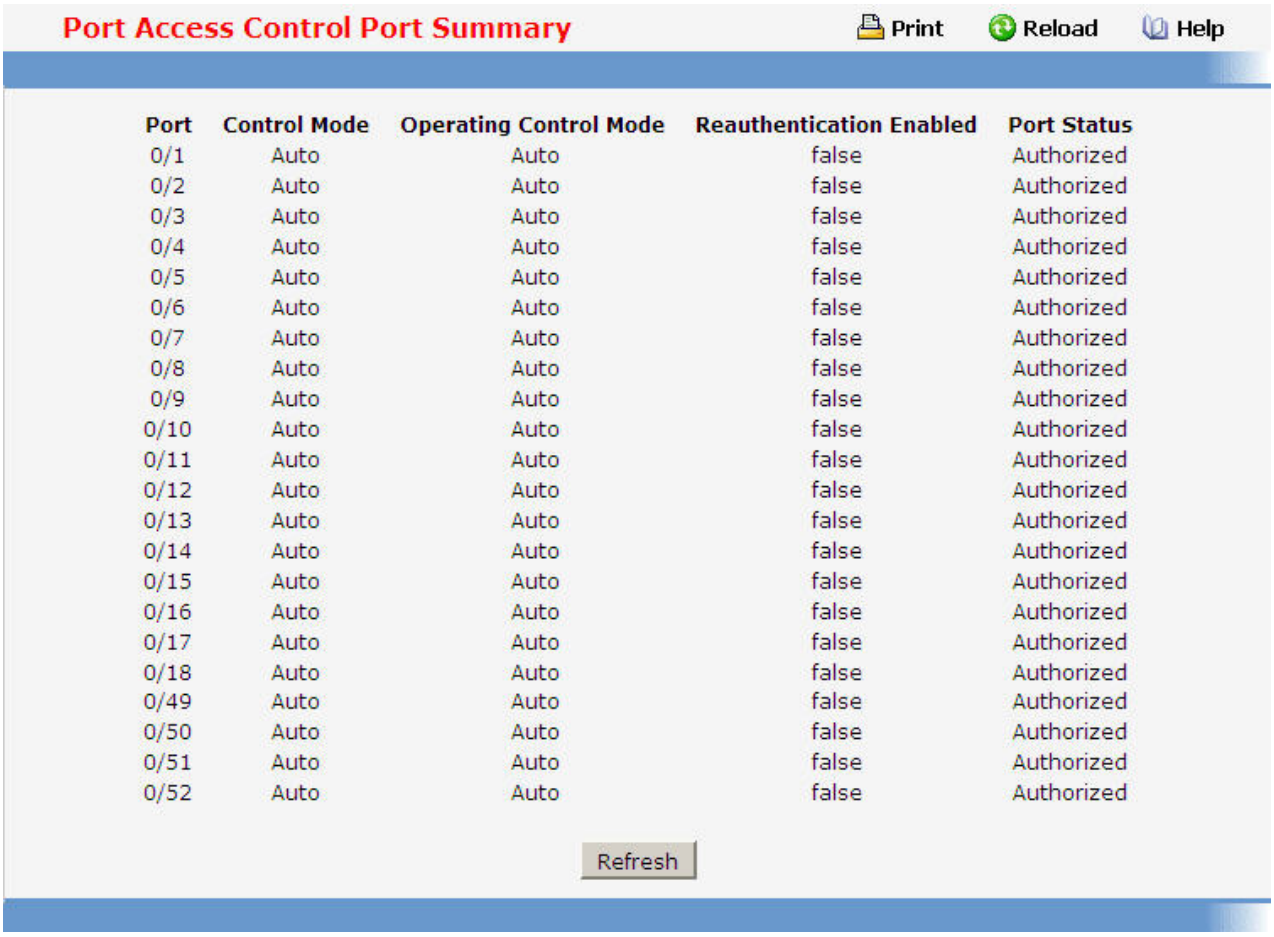
Port Access Control Port Summary
Print
Reload
Help
Port Control Mode Operating Control Mode Reauthentication Enabled Port Status
0/1 Auto Auto false Authorized
0/2 Auto Auto false Authorized
0/3 Auto Auto false Authorized
0/4 Auto Auto false Authorized
0/5 Auto Auto false Authorized
0/6 Auto Auto false Authorized
0/7 Auto Auto false Authorized
0/8 Auto Auto false Authorized
0/9 Auto Auto false Authorized
0/10 Auto Auto false Authorized
0/11 Auto Auto false Authorized
0/12 Auto Auto false Authorized
0/13 Auto Auto false Authorized
0/14 Auto Auto false Authorized
0/15 Auto Auto false Authorized
0/16 Auto Auto false Authorized
0/17 Auto Auto false Authorized
0/18 Auto Auto false Authorized
0/49 Auto Auto false Authorized
0/50 Auto Auto false Authorized
0/51 Auto Auto false Authorized
0/52 Auto Auto false Authorized
Refresh

Viewing each Port Access Control Statistics Page

Selection Criteria

Port - Selects the port to be displayed. When the selection is changed, a screen refresh will occur causing all fields to be updated for the newly selected port. All physical interfaces are valid.

Non-Configurable Data

EAPOL Frames Received - This displays the number of valid EAPOL frames of any type that have been received by this authenticator.

EAPOL Frames Transmitted - This displays the number of EAPOL frames of any type that have been transmitted by this authenticator.

EAPOL Start Frames Received - This displays the number of EAPOL start frames that have been received by this authenticator.

EAPOL Logoff Frames Received - This displays the number of EAPOL logoff frames that have been received by this authenticator.

Last EAPOL Frame Version - This displays the protocol version number carried in the most recently received EAPOL frame.

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Last EAPOL Frame Source - This displays the source MAC address carried in the most recently received EAPOL frame.

EAP Response/Id Frames Received - This displays the number of EAP response/identity frames that have been received by this authenticator.

EAP Response Frames Received - This displays the number of valid EAP response frames (other than resp/id frames) that have been received by this authenticator.

EAP Request/Id Frames Transmitted - This displays the number of EAP request/identity frames that have been transmitted by this authenticator.

EAP Request Frames Transmitted - This displays the number of EAP request frames (other than request/identity frames) that have been transmitted by this authenticator.

Invalid EAPOL Frames Transmitted - This displays the number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.

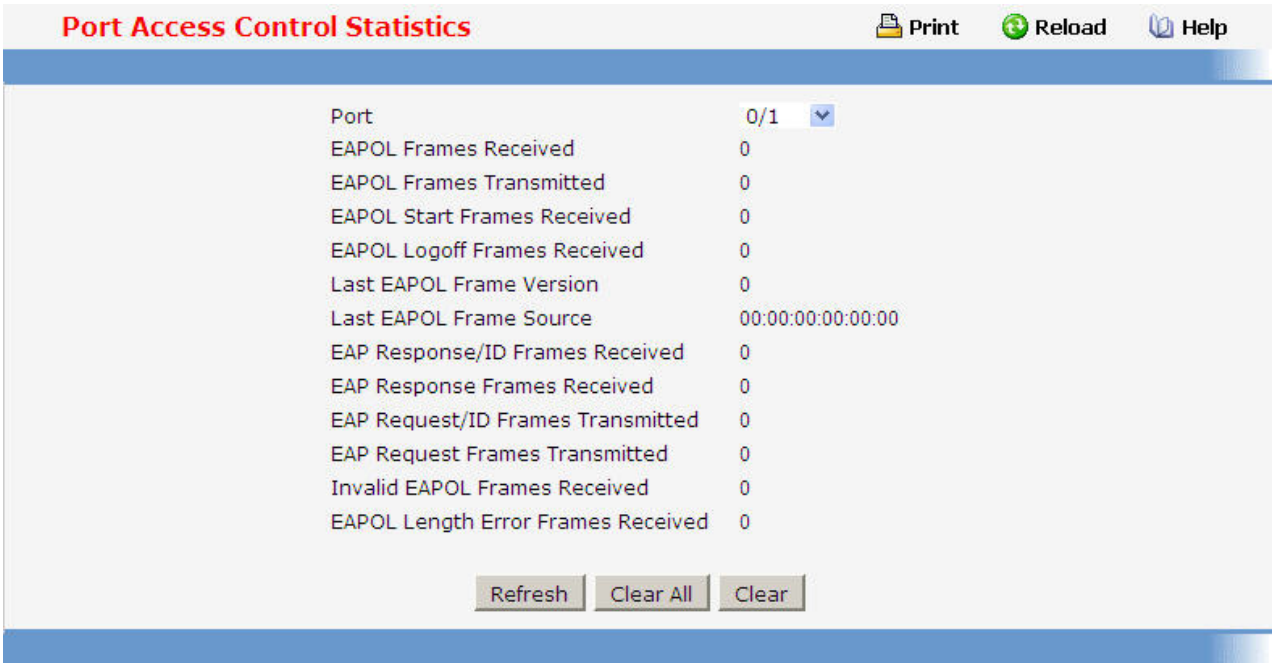
EAP Length Error Frames Received - This displays the number of EAPOL frames that have been received by this authenticator in which the frame type is not recognized.

Command Buttons

Refresh - Update the information on the page.

Clear All - This button resets all statistics for all ports to 0. There is no confirmation prompt. When this button is pressed, the stats are immediately cleared.

Clear - This button resets the statistics for the selected port. There is no confirmation prompt. When this button is pressed, the stats are immediately cleared.



Defining Access Control User Login Page

Selection Criteria

Users - Selects the user name that will use the selected login list for 802.1x port security.

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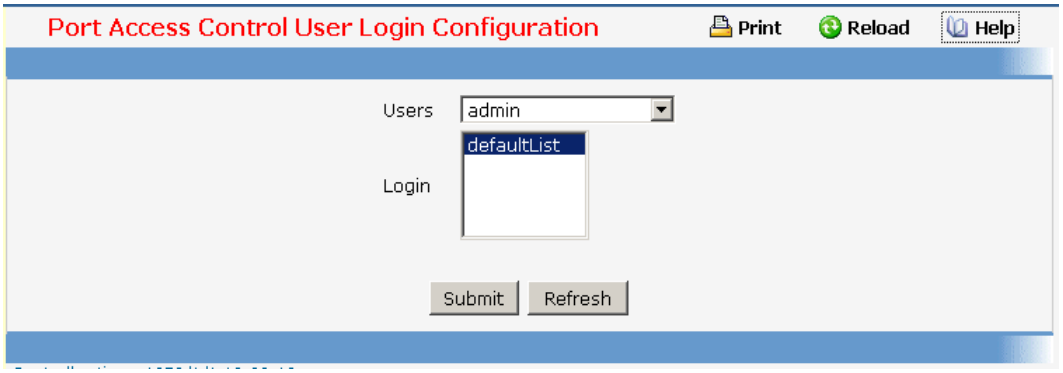
Configurable Data

Login - Selects the login to apply to the specified user. All configured logins are displayed.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.



Defining each Port Access Privileges Page

Selection Criteria

Port - Selects the port to configure.

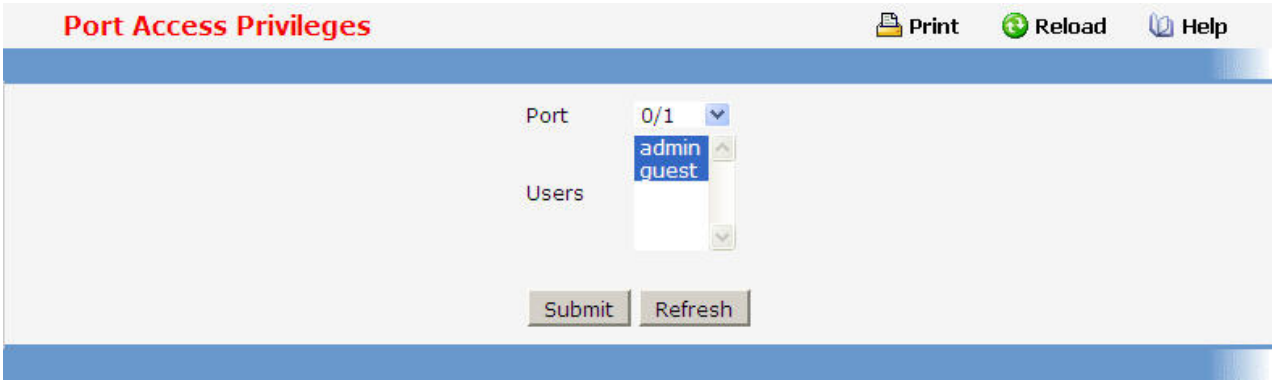
Configurable Data

Users - Selects the users that have access to the specified port or ports.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.



Viewing each Port Access Privileges Summary Page

Non-Configurable Data

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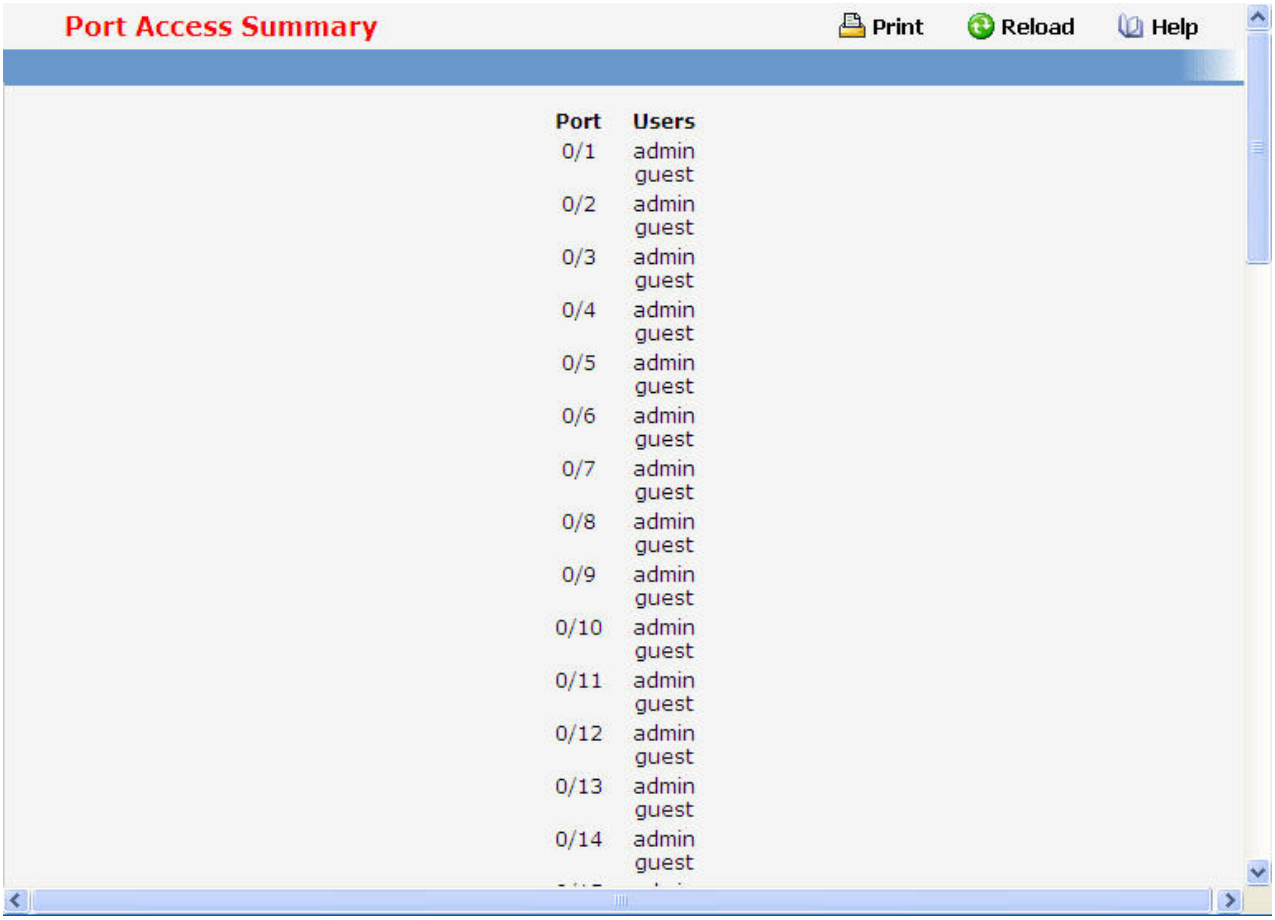
Port - Displays the port in Slot/Port format.

Users - Displays the users that have access to the port.

Command Buttons

Refresh - Update the information on the page.



8.2.4.2 **Managing RADIUS**

Configuring RADIUS Configuration Page

Configurable Data

Max Number of Retransmits - The value of the maximum number of times a request packet is retransmitted. The valid range is 1 - 15. Consideration to maximum delay time should be given when configuring RADIUS maxretransmit and RADIUS timeout. If multiple RADIUS servers are configured, the max retransmit value on each will be exhausted before the next server is attempted. A retransmit will not occur until the configured timeout value on that server has passed without a response from the RADIUS server. Therefore, the maximum delay in receiving a response from the RADIUS application equals the

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sum of (retransmit times timeout) for all configured servers. If the RADIUS request was generated by a user login attempt, all user interfaces will be blocked until the RADIUS application returns a response.

Timeout Duration (secs) - The timeout value, in seconds, for request retransmissions. The valid range is 1 - 30. Consideration to maximum delay time should be given when configuring RADIUS maxretransmit and RADIUS timeout. If multiple RADIUS servers are configured, the max retransmit value on each will be exhausted before the next server is attempted. A retransmit will not occur until the configured timeout value on that server has passed without a response from the RADIUS server. Therefore, the maximum delay in receiving a response from the RADIUS application equals the sum of (retransmit times timeout) for all configured servers. If the RADIUS request was generated by a user login attempt, all user interfaces will be blocked until the RADIUS application returns a response.

Accounting Mode - Selects if the RADIUS accounting mode is enabled or disabled.

Non-Configurable Data

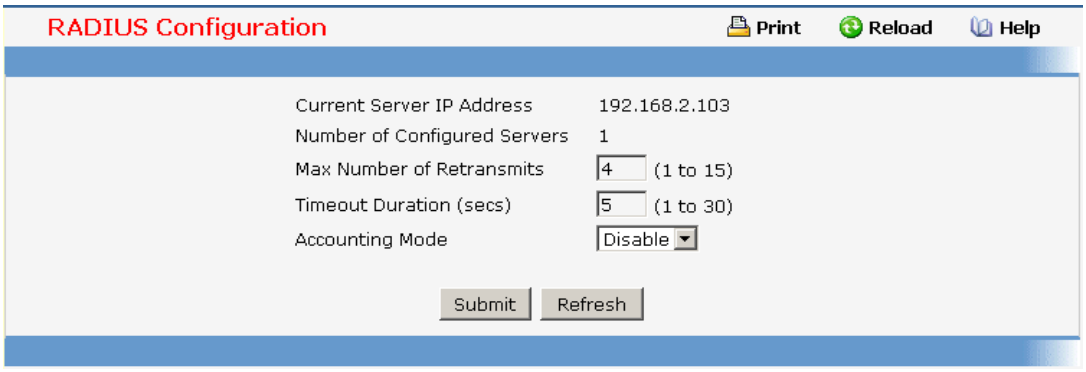
Current Server IP Address - The IP address of the current server. This field is blank if no servers are configured.

Number of Configured Servers - The number of RADIUS servers that have been configured. This value will be in the range of 0 and 3.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.



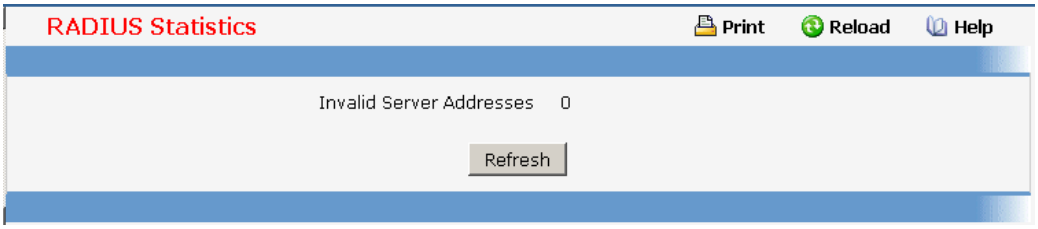
Viewing Radius Statistics Page

Non-Configurable Data

Invalid Server Addresses - The number of RADIUS Access-Response packets received from unknown addresses.

Command Buttons

Refresh - Update the information on the page.



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Configuring RADIUS Server Configuration Page

Selection Criteria

RADIUS Server IP Address - Selects the RADIUS server to be configured. Select add to add a server.

Configurable Data

IP Address - The IP address of the server being added.

Port - The UDP port used by this server. The valid range is 0 - 65535.

Secret - The shared secret for this server. This is an input field only.

Apply - The Secret will only be applied if this box is checked. If the box is not checked, anything entered in the Secret field will have no affect and will not be retained. This field is only displayed if the user has READWRITE access.

Primary Server - Sets the selected server to the Primary or Secondary server.

Message Authenticator - Enable or disable the message authenticator attribute for the selected server.

Non-Configurable Data

Current - Indicates if this server is currently in use as the authentication server.

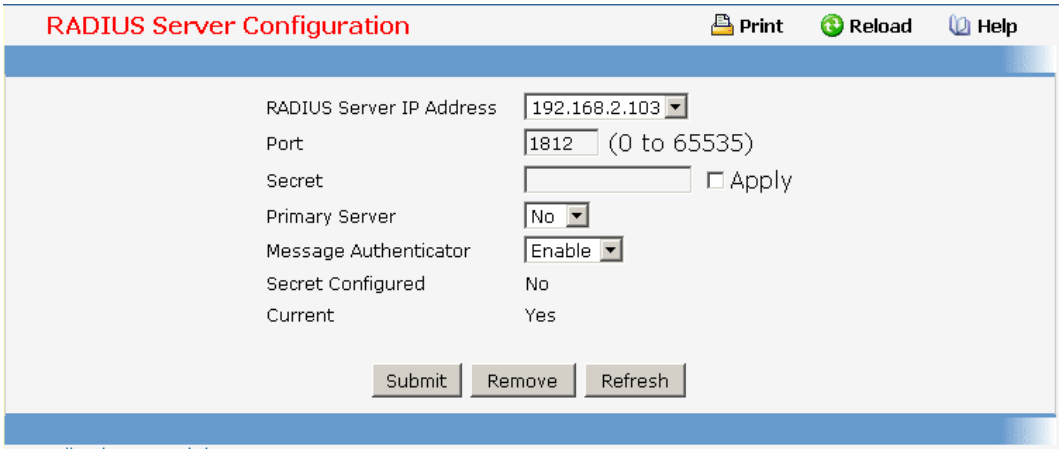
Secret Configured - Indicates if the shared secret for this server has been configured.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Remove - Remove the selected server from the configuration. This button is only available to READWRITE users. These changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.



Viewing RADIUS Server Statistics Page

Selection Criteria

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RADIUS Server IP Address - Selects the IP address of the RADIUS server for which to display statistics.

Non-Configurable Data

Round Trip Time (secs) - The time interval, in hundredths of a second, between the most recent Access-Reply/Access-Challenge and the Access-Request that matched it from this RADIUS authentication server.

Access Requests - The number of RADIUS Access-Request packets sent to this server. This number does not include retransmissions.

Access Retransmissions - The number of RADIUS Access-Request packets retransmitted to this server.

Access Accepts - The number of RADIUS Access-Accept packets, including both valid and invalid packets that were received from this server.

Access Rejects - The number of RADIUS Access-Reject packets, including both valid and invalid packets that were received from this server.

Access Challenges - The number of RADIUS Access-Challenge packets, including both valid and invalid packets that were received from this server.

Malformed Access Responses - The number of malformed RADIUS Access-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators or signature attributes or unknown types are not included as malformed access-responses.

Bad Authenticators - The number of RADIUS Access-Response packets containing invalid authenticators or signature attributes received from this server.

Pending Requests - The number of RADIUS Access-Request packets destined for this server that have not yet timed out or received a response.

Timeouts - The number of authentication timeouts to this server.

Unknown Types - The number of RADIUS packets of unknown type which were received from this server on the authentication port.

Packets Dropped - The number of RADIUS packets received from this server on the authentication port and dropped for some other reason.

Command Buttons

Refresh - Update the information on the page.

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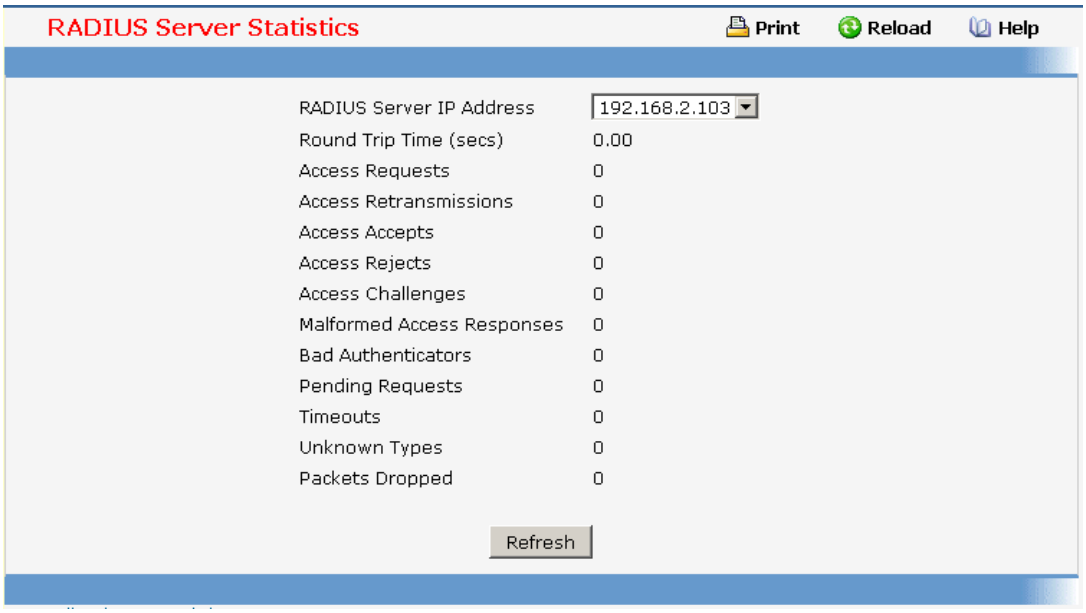

Defining RADIUS Accounting Server Configuration Page

Selection Criteria

Accounting Server IP Address - Selects the accounting server for which data is to be displayed or configured. If the add item is selected, a new accounting server can be configured.

Configurable Data

IP Address - The IP address of the accounting server to add. This field is only configurable if the add item is selected.

Port - Specifies the UDP Port to be used by the accounting server. The valid range is 0 - 65535. If the user has READONLY access, the value is displayed but cannot be changed.

Secret - Specifies the shared secret to use with the specified accounting server. This field is only displayed if the user has READWRITE access.

Apply - The Secret will only be applied if this box is checked. If the box is not checked, anything entered in the Secret field will have no affect and will not be retained. This field is only displayed if the user has READWRITE access.

Non-Configurable Data

Secret Configured - Indicates if the secret has been configured for this accounting server.

Command Buttons

Submit - Sends the updated screen to the switch and causes the changes to take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Remove - Remove the selected accounting server from the configuration. This button is only available to READWRITE users. These changes will not be retained across a power cycle unless a save is performed.

Refresh - Update the information on the page.

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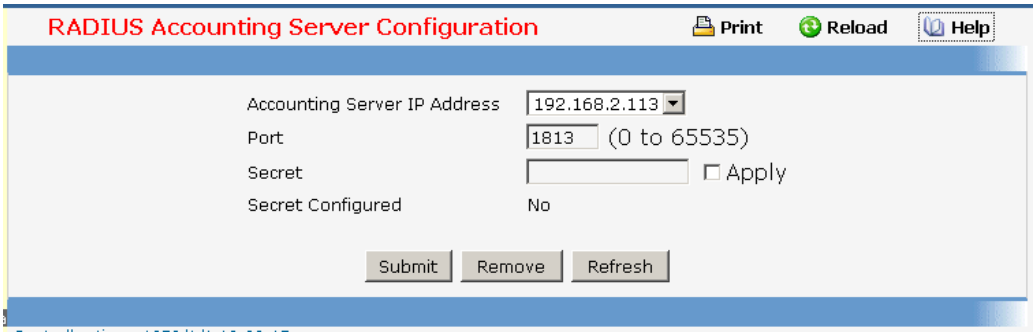

Viewing RADIUS Accounting Server Statistics Page

Non-Configurable Statistics

Accounting Server IP Address - Identifies the accounting server associated with the statistics.

Round Trip Time (secs) - Displays the time interval, in hundredths of a second, between the most recent Accounting-Response and the Accounting-Request that matched it from this RADIUS accounting server.

Accounting Requests - Displays the number of RADIUS Accounting-Request packets sent not including retransmissions.

Accounting Retransmissions - Displays the number of RADIUS Accounting-Request packets retransmitted to this RADIUS accounting server.

Accounting Responses - Displays the number of RADIUS packets received on the accounting port from this server.

Malformed Accounting Responses - Displays the number of malformed RADIUS Accounting-Response packets received from this server. Malformed packets include packets with an invalid length. Bad authenticators and unknown types are not included as malformed accounting responses.

Bad Authenticators - Displays the number of RADIUS Accounting-Response packets that contained invalid authenticators received from this accounting server.

Pending Requests - Displays the number of RADIUS Accounting-Request packets sent to this server that have not yet timed out or received a response.

Timeouts - Displays the number of accounting timeouts to this server.

Unknown Types - Displays the number of RADIUS packets of unknown type that were received from this server on the accounting port.

Packets Dropped - Displays the number of RADIUS packets that were received from this server on the accounting port and dropped for some other reason.

Command Buttons

Refresh - Update the information on the page.

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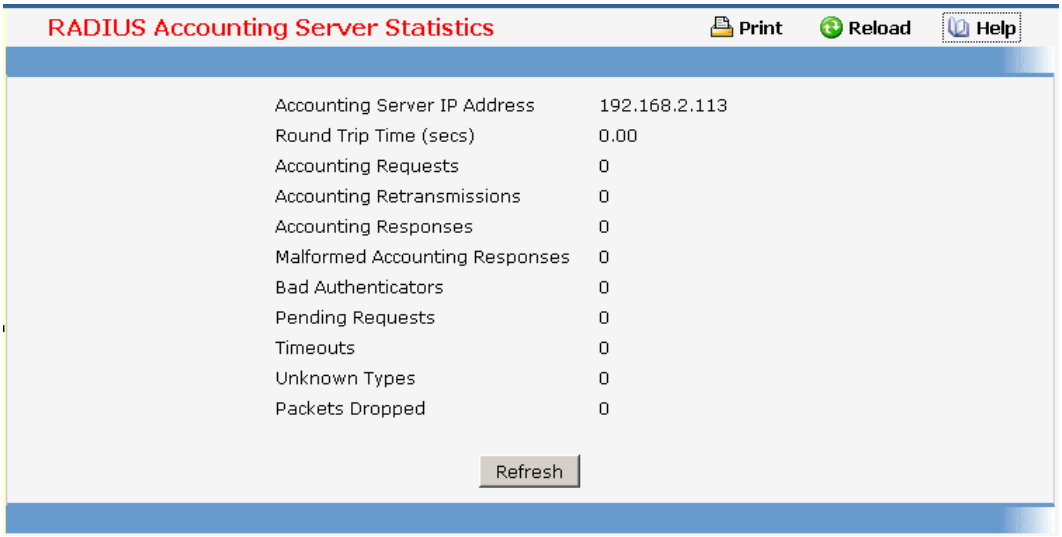
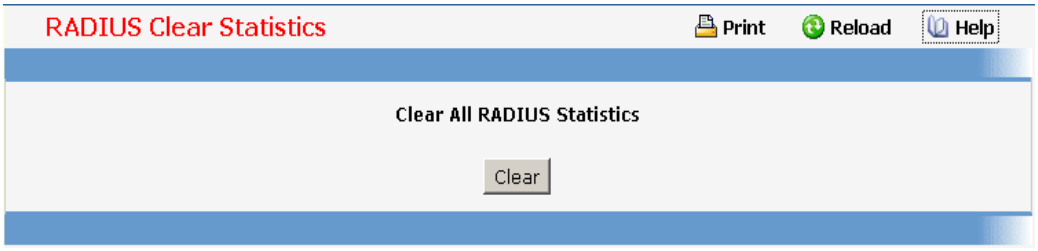


Resetting All RADIUS Statistics Page

Command Buttons

Clear All RADIUS Statistics - This button will clear the accounting server, authentication server, and RADIUS statistics.



8.2.4.3 **Defining TACACS Configuration**

Configuring TACACS Configuration Page

Use this menu to configure the parameters for TACACS+, which is used to verify the login user's authentication. Note that only a user with Read/Write access privileges may change the data on this screen.

Configurable Data

Authen. State - TACACS+ administration mode which are Enable and Disable.

Server ID - The TACACS+ server index which are 1, 2, and 3.

Authen. Server - TACACS+ server IP address.

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Authen. Port - The TCP port number of TACACS+.

Server Time Out - Timeout value of TACACS+ packet transmit.

Retry Count - Retry count after transmit timeout.

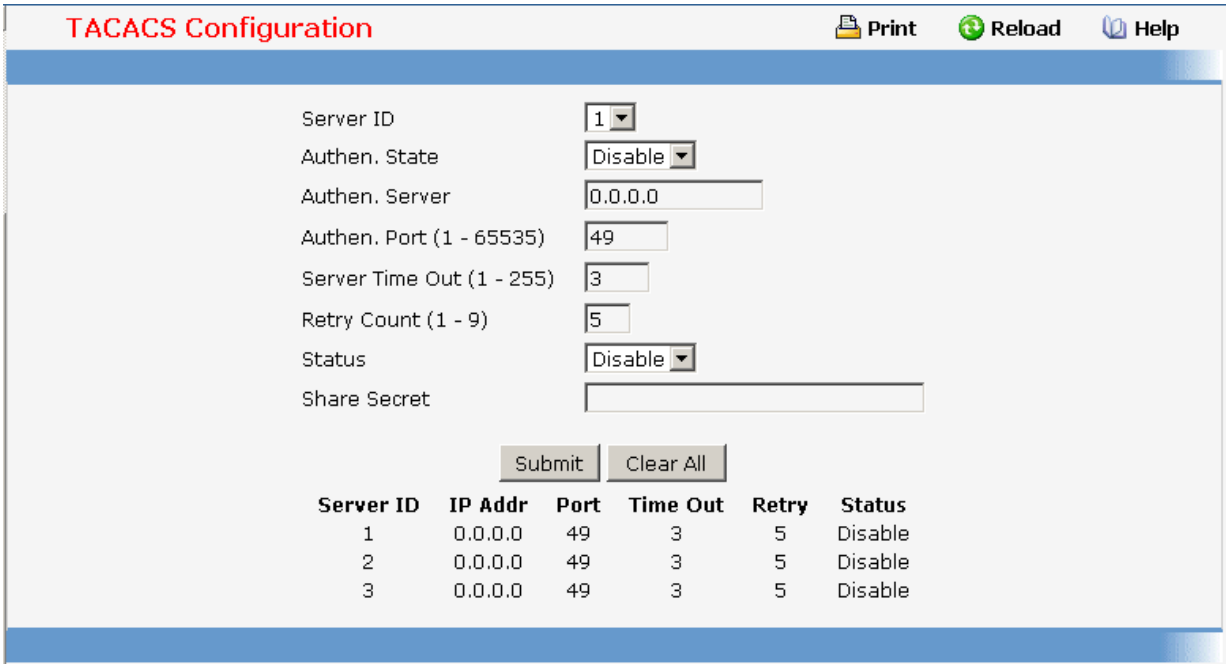
Status - The TACACS+ server status which are "disable", “master" and "slave".

Share Secret - The key only transmit between TACACS+ client and server..

Command Buttons

Submit - Send the updated screen to the switch. Changes take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Clear All - Reset all configured to default.



8.2.4.4 **Defining IP Filter Configuration**

IP Filter Configuration Page

Management IP filter designates stations that are allowed to make configuration changes to the Switch. Select up to five management stations used to manage the Switch. If you choose to define one or more designated management stations, only the chosen stations, as defined by IP address, will be allowed management privilege through the web manager, Telnet session, Secure Shell (SSH) or Secure Socket Layer (SSL) for secure HTTP.

Configurable Data

Filter Address 1~5 - Stations that are allowed to make configuration changes to the Switch.

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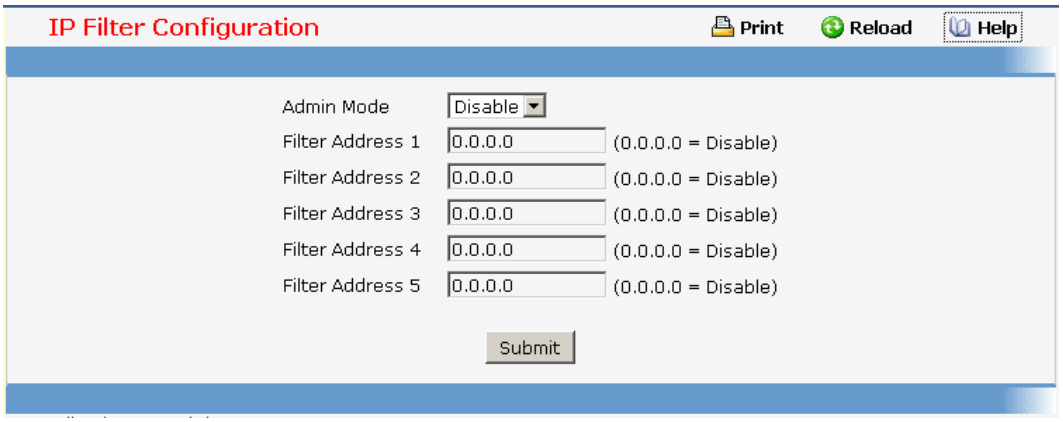
Command Buttons

Submit - Send the updated screen to the switch. Changes take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.



8.2.4.5 Defining Secure Http Configuration

Secure HTTP Configuration Page

Configurable Data

Admin Mode - This field is used to enable or disable the Administrative Mode of Secure HTTP. The currently configured value is shown when the web page is displayed. The default value is disabled.

TLS Version 1 - This field is used to enable or disable Transport Layer Security Version 1.0. The currently configured value is shown when the web page is displayed. The default value is enabled.

SSL Version 3 - This field is used to enable or disable Secure Sockets Layer Version 3.0. The currently configured value is shown when the web page is displayed. The default value is enabled.

HTTPS Port Number - This field is used to set the HTTPS Port Number. The value must be in the range of 1 to 65535. Port 443 is the default value. The currently configured value is shown when the web page is displayed.

Command Buttons

Submit - Send the updated screen to the switch. Changes take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Download Certificates - Link to the File Transfer page for the SSL Certificate download. Note that to download SSL Certificate files SSL must be administratively disabled.

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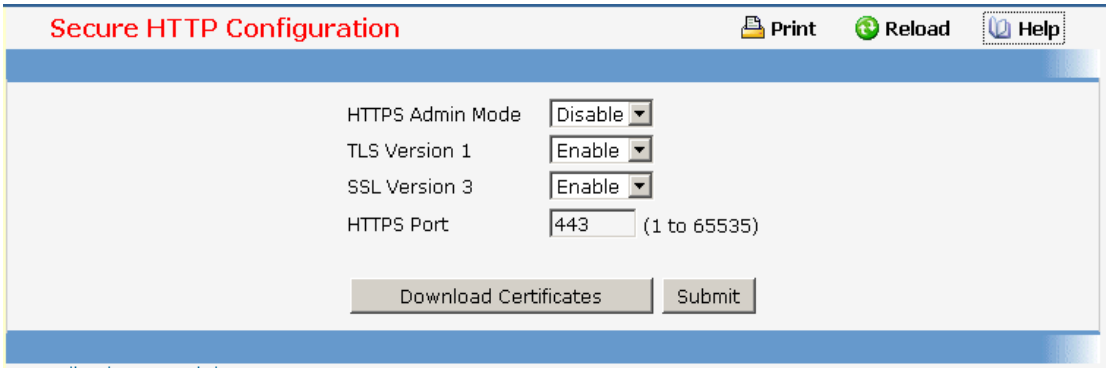

8.2.4.6 **Defining Secure Shell Configuration**

Configuring Secure Shell Configuration Page

Configurable Data

Admin Mode - This select field is used to Enable or Disable the administrative mode of SSH. The currently configured value is shown when the web page is displayed. The default value is Disable.

SSH Version 1 - This select field is used to Enable or Disable Protocol Level 1 for SSH. The currently configured value is shown when the web page is displayed. The default value is Enable.

SSH Version 2 - This select field is used to Enable or Disable Protocol Level 2 for SSH. The currently configured value is shown when the web page is displayed. The default value is Enable.

Maximum Number of SSH Sessions Allowed - This select field is used to configure the maximum number of inbound SSH sessions allowed on the switch. The currently configured value is shown when the web page is displayed. The range of acceptable values for this field is (0-5).

SSH Session Timeout (Minutes) - This text field is used to configure the inactivity timeout value for incoming SSH sessions to the switch. The acceptable range for this value is (1-160) minutes.

Non-Configurable Data

SSH Connections in Use - Displays the number of SSH connections currently in use in the system.

Command Buttons

Submit - Send the updated screen to the switch. Changes take effect on the switch but these changes will not be retained across a power cycle unless a save is performed.

Download Host Keys - Link to the File Transfer page for the Host Key download. Note that to download SSH key files SSH must be administratively disabled and there can be no active SSH sessions.

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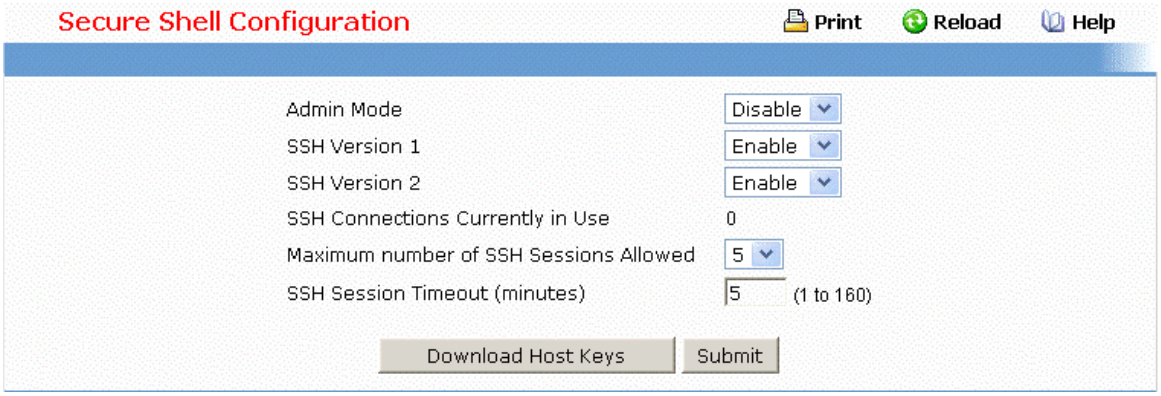

8.2.5 *QOS Menu*

8.2.5.1 **Managing Access Control Lists**

Configuring IP Access Control List Configuration Page

An IP ACL consists of a set of rules which are matched sequentially against a packet. When a packet meets the match criteria of a rule, the specified rule action (Permit/Deny) is taken and the additional rules are not checked for a match. On this menu the interfaces to which an IP ACL applies must be specified, as well as whether it applies to inbound traffic. Rules for the IP ACL are specified/created using the IP ACL Rule Configuration menu.

Selection Criteria

IP ACL - Make a selection from the pulldown menu. A new IP Access Control List may be created or the configuration of an existing IP ACL can be updated.

Configurable Data

IP ACL ID - IP ACL ID must be a whole number in the range of 1 to 99 for IP Standard Access Lists and 100 to 199 for IP Extended Access Lists.

Non-Configurable Data

Table - Displays the current and maximum number of IP ACLs.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Removes the currently selected IP ACL from the switch configuration.

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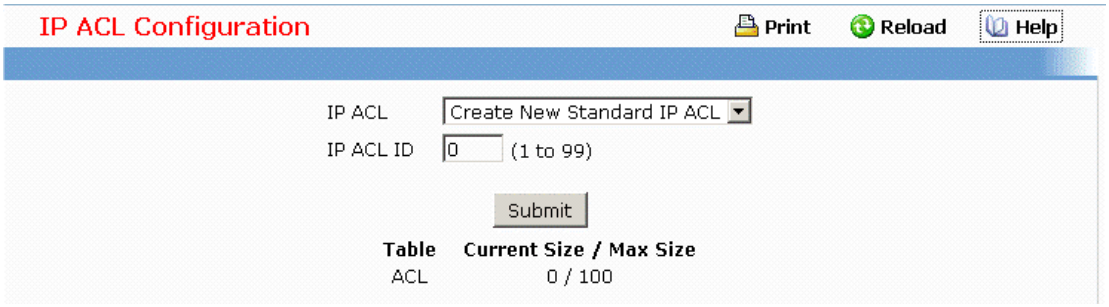

Viewing IP Access Control List Summary Page

Non-Configurable Data

IP ACL ID - The IP ACL identifier.

Rules - The number of rules currently configured for the IP ACL.

Direction - The direction of packet traffic affected by the IP ACL. Direction can only be:

- ***Inbound***

Slot/Port(s) - The interfaces to which the IP ACL applies.

Command Buttons

Refresh - Refresh the data on the screen to the latest state.

Configuring IP Access Control List Rule Configuration Page

Use these screens to configure the rules for the IP Access Control Lists created using the IP Access Control List Configuration screen. What is shown on this screen varies depending on the current step in the rule configuration process. A Standard/Extended IP ACL must first be selected to configure rules for. The rule identification, and the 'Action' and 'Match Every' parameters must be specified next. If 'Match Every' is set to false a new screen will then be presented from which the match criteria can be configured.

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Selection Criteria

IP ACL ID - Use the pulldown menu to select the IP ACL for which to create or update a rule.

Rule - Select an existing rule from the pulldown menu, or select 'Create New Rule.' ACL as well as an option to add a new Rule. New rules cannot be created if the maximum number of rules has been reached. For each rule, a packet must match all the specified criteria in order to be true against that rule and for the specified rule action (Permit/Deny) to take place.

Configurable Data

Rule ID - Enter a whole number in the range of 1 to 8 that will be used to identify the rule. An IP ACL may have up to 8 rules.

Action - Specify what action should be taken if a packet matches the rule's criteria. The choices are permit or deny.

Assign Queue ID - Specifies the hardware egress queue identifier used to handle all packets matching this IP ACL rule. Valid range of Queue Ids is (0 to 6). This field is visible when 'Permit' is chosen as 'Action'.

Redirect Interface - Specifies the specific egress interface where the matching traffic stream is forced, bypassing any forwarding decision normally performed by the device. This field is visible when 'Permit' is chosen as 'Action'.

Match Every - Select true or false from the pulldown menu. True signifies that all packets will match the selected IP ACL and Rule and will be either permitted or denied. In this case, since all packets match the rule, the option of configuring other match criteria will not be offered. To configure specific match criteria for the rule, remove the rule and re-create it, or re-configure 'Match Every' to 'False' for the other match criteria to be visible.

Protocol Keyword - Specify that a packet's IP protocol is a match condition for the selected IP ACL rule. The possible values are ICMP, IGMP, IP, TCP, and UDP. Either the 'Protocol Keyword' field or the 'Protocol Number' field can be used to specify an IP protocol value as a match criterion.

Protocol Number - Specify that a packet's IP protocol is a match condition for the selected IP ACL rule and identify the protocol by number. The protocol number is a standard value assigned by IANA and is interpreted as an integer from 1 to 255. Either the 'Protocol Number' field or the 'Protocol Keyword' field can be used to specify an IP protocol value as a match criterion.

Source IP Address - Enter an IP address using dotted-decimal notation to be compared to a packet's source IP Address as a match criteria for the selected IP ACL rule.

Source IP Mask - Specify the IP Mask in dotted-decimal notation to be used with the Source IP Address value.

Source L4 Port Keyword - Specify a packet's source layer 4 port as a match condition for the selected extended IP ACL rule. This is an optional configuration. The possible values are DOMAIN, ECHO, FTP, FTPDATA, HTTP, SMTP, SNMP, TELNET, TFTP, and WWW. Each of these values translates into its equivalent port number, which is used as both the start and end of the port range.

Source L4 Port Number - Specify a packet's source layer 4 port as a match condition for the selected extended IP ACL rule. This is an optional configuration.

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Destination IP Address - Enter an IP address using dotted-decimal notation to be compared to a packet's destination IP Address as a match criteria for the selected extended IP ACL rule.

Destination IP Mask - Specify the IP Mask in dotted-decimal notation to be used with the Destination IP Address value.

Destination L4 Port Keyword - Specify the destination layer 4 port match conditions for the selected extended IP ACL rule. The possible values are DOMAIN, ECHO, FTP, FTPDATA, HTTP, SMTP, SNMP, TELNET, TFTP, and WWW. Each of these values translates into its equivalent port number, which is used as both the start and end of the port range. This is an optional configuration.

Destination L4 Port Number - Specify a packet's destination layer 4 port number match condition for the selected extended IP ACL rule. This is an optional configuration.

Service Type - Select a Service Type match condition for the extended IP ACL rule from the pulldown menu. The possible values are IP DSCP, IP precedence, and IP TOS, which are alternative ways of specifying a match criterion for the same Service Type field in the IP header, however each uses a different user notation. After a selection is made the appropriate value can be specified.

- ***IP DSCP Configuration***

Specify the IP DiffServ Code Point (DSCP) field. The DSCP is defined as the high-order six bits of the Service Type octet in the IP header. This is an optional configuration. Enter an integer from 0 to 63. The IP DSCP is selected by possibly selection one of the DSCP keyword from a dropdown box. If a value is to be selected by specifying its numeric value, then select the 'Other' option in the dropdown box and a text box will appear where the numeric value of the DSCP can be entered.

- ***IP Precedence Configuration***

The IP Precedence field in a packet is defined as the high-order three bits of the Service Type octet in the IP header. This is an optional configuration. Enter an integer from 0 to 7.

- ***IP TOS Configuration***

The IP TOS field in a packet is defined as all eight bits of the Service Type octet in the IP header. The TOS Bits value is a hexadecimal number from 00 to FF. The TOS Mask value is a hexadecimal number from 00 to FF. The TOS Mask denotes the bit positions in the TOS Bits value that are used for comparison against the IP TOS field in a packet. For example, to check for an IP TOS value having bits 7 and 5 set and bit 1 clear, where bit 7 is most significant, use a TOS Bits value of 0xA0 and a TOS Mask of 0xFF. This is an optional configuration.

Command Buttons

Configure - Configure the corresponding match criteria for the selected rule.

Delete - Remove the currently selected Rule from the selected ACL. These changes will not be retained across a power cycle unless a save configuration is performed.

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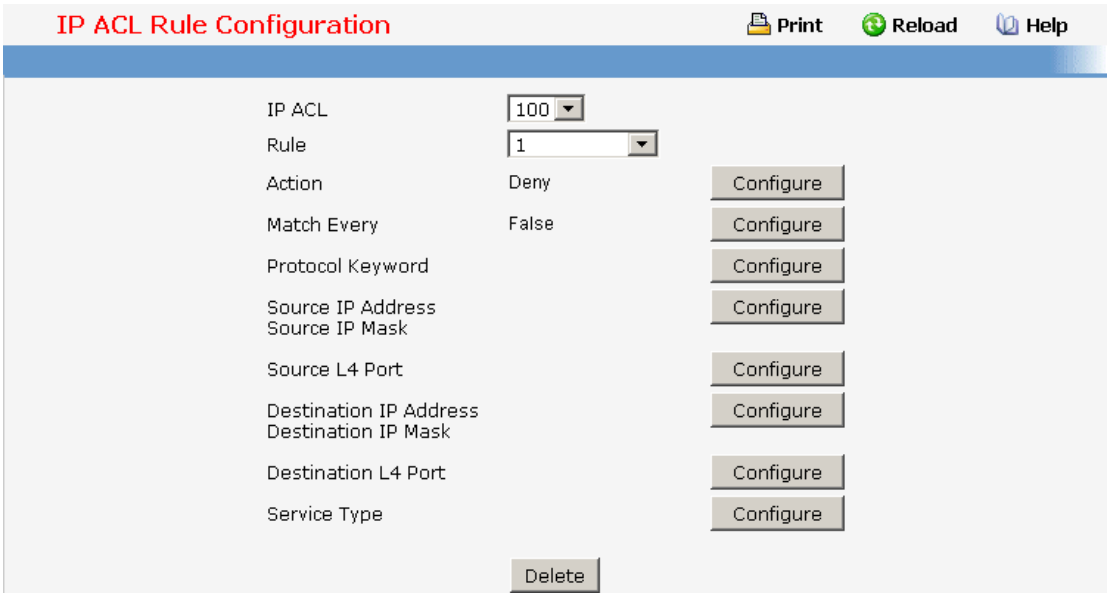

Configuring MAC Access Control List Configuration Page

A MAC ACL consists of a set of rules which are matched sequentially against a packet. When a packet meets the match criteria of a rule, the specified rule action (Permit/Deny) is taken and the additional rules are not checked for a match. On this menu the interfaces to which an MAC ACL applies must be specified, as well as whether it applies to inbound or outbound traffic. Rules for the MAC ACL are specified/created using the MAC ACL Rule Configuration menu.

Selection Criteria

MAC ACL - A new MAC Access Control List may be created or the configuration of an existing MAC ACL can be updated based on selection.

Configurable Data

MAC ACL Name - Specifies MAC ACL Name string which may include alphabetic, numeric, dash, underscore or space characters only. The name must start with an alphabetic character. This field displays the name of the currently selected MAC ACL if the ACL has already been created.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Rename - Renames the currently selected MAC ACL.

Delete - Removes the currently selected MAC ACL from the switch configuration.

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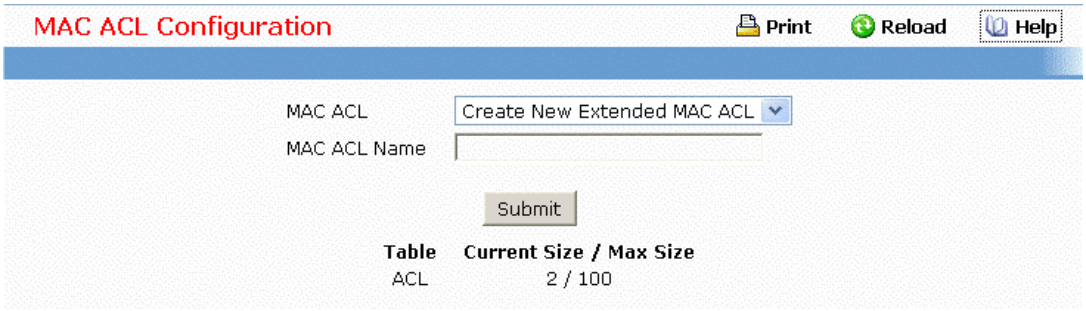


Viewing MAC Access Control List Summary Page

Non-Configurable Data

MAC ACL Name - MAC ACL identifier.

Rules - The number of rules currently configured for the MAC ACL.

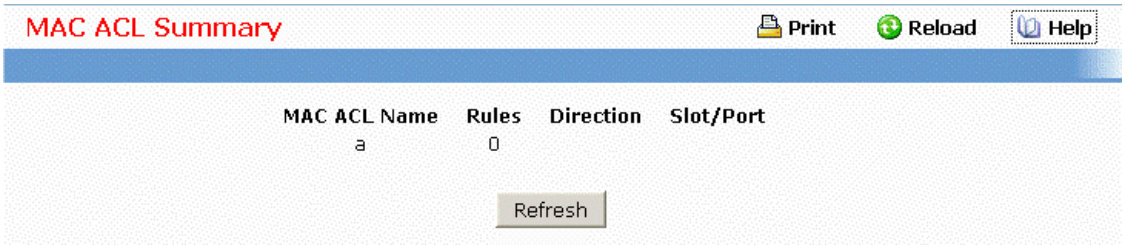
Direction - The direction of packet traffic affected by the MAC ACL.
Valid Directions

- ***Inbound***

Slot/Port - The interfaces to which the MAC ACL applies.

Command Buttons

Refresh - Refresh the data on the screen to the latest state.



Configuring MAC Access Control List Rule Configuration Page

Selection Criteria

MAC ACL - Select the MAC ACL for which to create or update a rule.

Rule - Select an existing rule or select 'Create New Rule' to add a new Rule. New rules cannot be created if the maximum number of rules has been reached. For each rule, a packet must match all the specified criteria in order to be true against that rule and for the specified rule action (Permit/Deny) to take place.

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Configurable Data

Rule - Enter a whole number in the range of (1 to 8) that will be used to identify the rule.

Action - Specify what action should be taken if a packet matches the rule's criteria. The choices are permit or deny.

Assign Queue ID - Specifies the hardware egress queue identifier used to handle all packets matching this ACL rule. Valid range of Queue Ids is (0 to 6).

Redirect Interface - Specifies the specific egress interface where the matching traffic stream is forced, bypassing any forwarding decision normally performed by the device.

CoS - Specifies the 802.1p user priority to compare against an Ethernet frame. Valid range of values is (0 to 7).

Destination MAC - Specifies the destination MAC address to compare against an Ethernet frame. Valid format is (xx:xx:xx:xx:xx:xx). The BPDU keyword may be specified using a Destination MAC address of 01:80:C2:xx:xx:xx.

Ethertype Key - Specifies the Ethertype value to compare against an Ethernet frame.
Valid values are

- ***Appletalk***
- ***ARP***
- ***IBM SNA***
- ***IPv4***
- ***IPv6***
- ***IPX***
- ***MPLS multicast***
- ***MPLS unicast***
- ***NetBIOS***
- ***Novell***
- ***PPPoE***
- ***Reverse ARP***
- ***User Value***

Ethertype User Value - Specifies the user defined customised Ethertype value to be used when the user has selected "User Value" as Ethertype Key, to compare against an Ethernet frame. Valid range of values is (0x0600 to 0xFFFF).

Source MAC - Specifies the Source MAC address to compare against an Ethernet frame. Valid format is (xx:xx:xx:xx:xx:xx).

VLAN - Specifies the VLAN ID to compare against an Ethernet frame. Valid range of values is (1 to 3965). Either VLAN Range or VLAN can be configured.

Match Every - Specifies an indication to match every Layer 2 MAC packet.
Valid values are

- ***True*** - Signifies that every packet is considered to match the selected ACL Rule.
- ***False*** - Signifies that it is not mandatory for every packet to match the selected ACL Rule.

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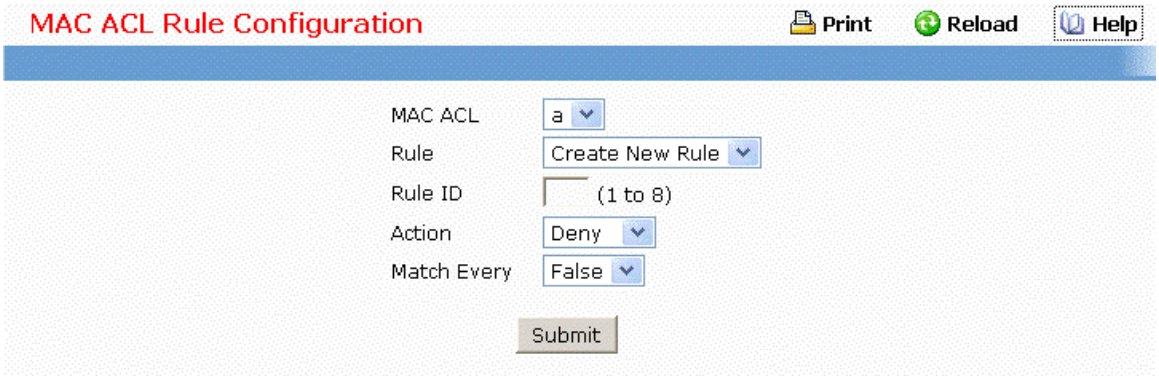
Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Remove the currently selected Rule from the selected ACL. These changes will not be retained across a power cycle unless a save configuration is performed.



Configuring Access Control List Interface Configuration Page

Configurable Data

Slot/Port - Specifies list of all available valid interfaces for ACL mapping. All non-routing physical interfaces and interfaces participating in LAGs are listed.

Direction - Specifies the packet filtering direction for ACL.
Valid Directions

- ***Inbound***

ACL Type - Specifies the type of ACL.
Valid ACL Types

- ***IP ACL***
- ***MAC ACL***

IP ACL - Specifies list of all IP ACLs. This field is visible only if the user has selected "IP ACL" as "ACL Type".

MAC ACL - Specifies list of all MAC ACLs. This field is visible only if the user has selected "MAC ACL" as "ACL Type".

Sequence Number - An optional sequence number may be specified to indicate the order of this access list relative to other access lists already assigned to this interface and direction. A lower number indicates higher precedence order. If a sequence number is already in use for this interface and direction, the specified access list replaces the currently attached access list using that sequence

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number. If the sequence number is not specified by the user, a sequence number that is one greater than the highest sequence number currently in use for this interface and direction will be used. Valid range is (1 to 4294967295).

Non-Configurable Data

Slot/Port - Displays selected interface.

Direction - Displays selected packet filtering direction for ACL.

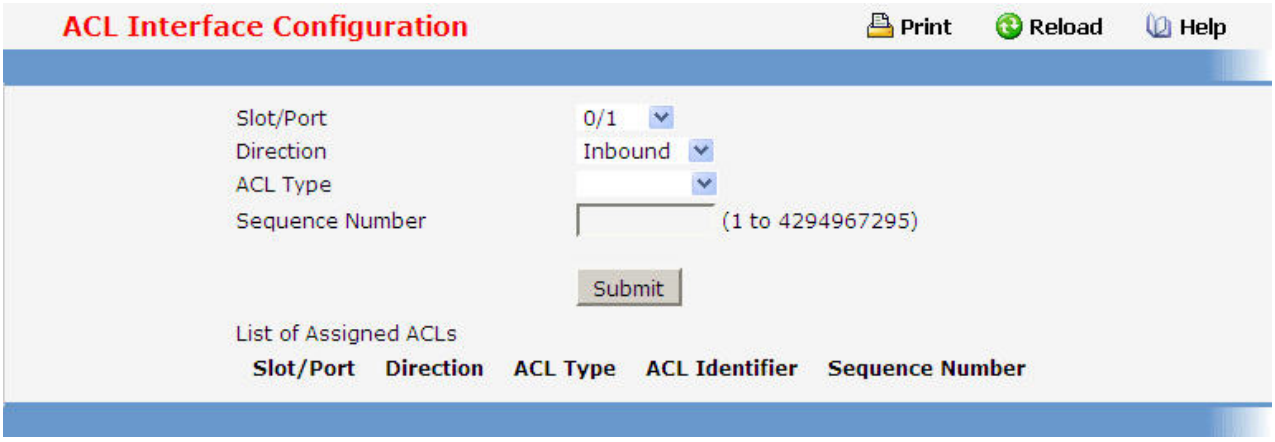
ACL Type - Displays the type of ACL assigned to selected interface and direction.

ACL Identifier - Displays the ACL Number(in case of IP ACL) or ACL Name(in case of MAC ACL) identifying the ACL assigned to selected interface and direction.

Sequence Number - Displays the Sequence Number signifying the order of specified ACL relative to other ACLs assigned to selected interface and direction.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



8.2.5.2 Managing Differentiated Services

Defining DiffServ Configuration Page

Operation

Packets are filtered and processed based on defined criteria. The filtering criteria is defined by a class. The processing is defined by a policy's attributes. Policy attributes may be defined

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on a per-class instance basis, and it is these attributes that are applied when a match occurs.

The configuration process begins with defining one or more match criteria for a class. Then one or more classes are added to a policy. Policies are then added to interfaces.

Packet processing begins by testing the match criteria for a packet. The 'all' class type option defines that each match criteria within a class must evaluate to true for a packet to match that class. The 'any' class type option defines that at least one match criteria must evaluate to true for a packet to match that class. Classes are tested in the order in which they were added to the policy. A policy is applied to a packet when a class match within that policy is found.

Selection Criteria

DiffServ Admin Mode - This lists the options for the mode, from which one can be selected. The default value is 'enable'. While disabled, the DiffServ configuration is retained when saved and can be changed, but it is not activated. When enabled, Diffserv services are activated.

Non-Configurable Data

Class table - Displays the number of configured DiffServ classes out of the total allowed on the switch.

Class Rule table - Displays the number of configured class rules out of the total allowed on the switch.

Policy table - Displays the number of configured policies out of the total allowed on the switch.

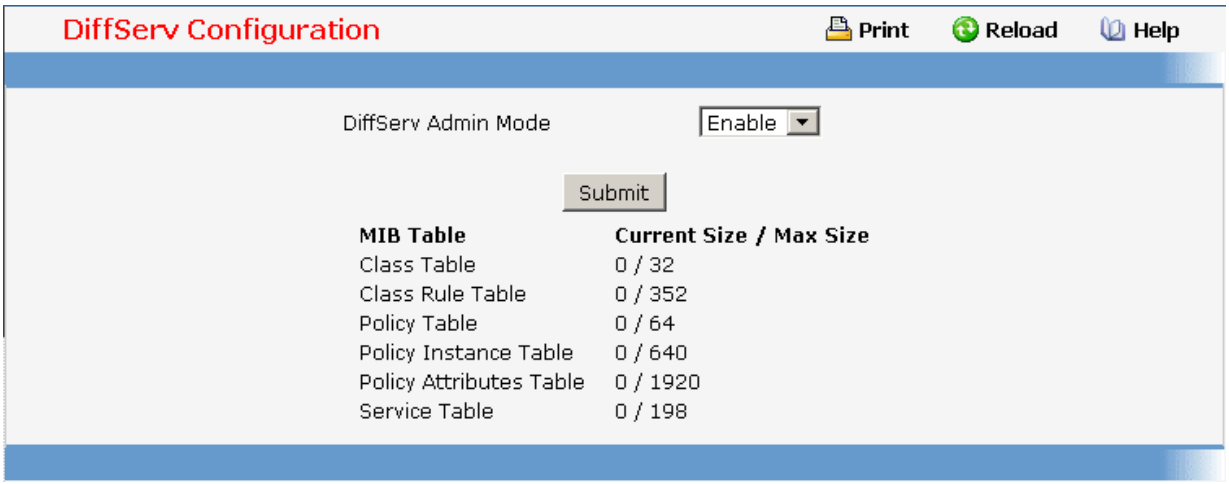
Policy Instance table - Displays the number of configured policy class instances out of the total allowed on the switch.

Policy Attributes table - Displays the number of configured policy attributes (attached to the policy class instances) out of the total allowed on the switch.

Service table - Displays the number of configured services (attached to the policies on specified interfaces) out of the total allowed on the switch.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Configuring DiffServ Class Configuration Page

Selection Criteria

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Class Selector - Along with an option to create a new class, this lists all the existing DiffServ class names, from which one can be selected. The content of this screen varies based on the selection of this field. If an existing class is selected then the screen will display the configured class. If '--create--' is selected, another screen appears to facilitate creation of a new class. The default is the first class created. If no classes exist, the default is '--create--'.

Class Type - This lists all the platform supported DiffServ class types from which one can be selected. Possible options are 'all', 'any', or 'acl'. If 'acl' is (supported and) selected, then an access list (ACL) number is required which is an integer specifying an existing ACL. Only when a new class is created, is this field a selector field. After class creation this becomes a non-configurable field displaying the configured class type.

Class Match Selector - This lists all match criteria from which one can be selected to be added to a specified class. The match criterion 'Every' denotes that every packet is considered to match the specified class and no additional input information is needed. The content of this drop down list varies for a specified class based on the selection of the match criterion 'Reference Class':

If the specified class does not reference any other class, the 'Reference Class' match criterion is included in the drop down match criteria list. A class reference can be established by selecting 'Reference Class' and invoking the 'Add Match Criteria' button.

If the specified class references another class, the 'Reference Class' match criterion is not included in the drop down match criteria list. This prevents the user from trying to add yet another class reference, since a specified class can reference at most one other class of the same type. Moreover, a 'Remove Class Reference' button appears on the screen that can be invoked to remove the current class reference.

Configurable Data

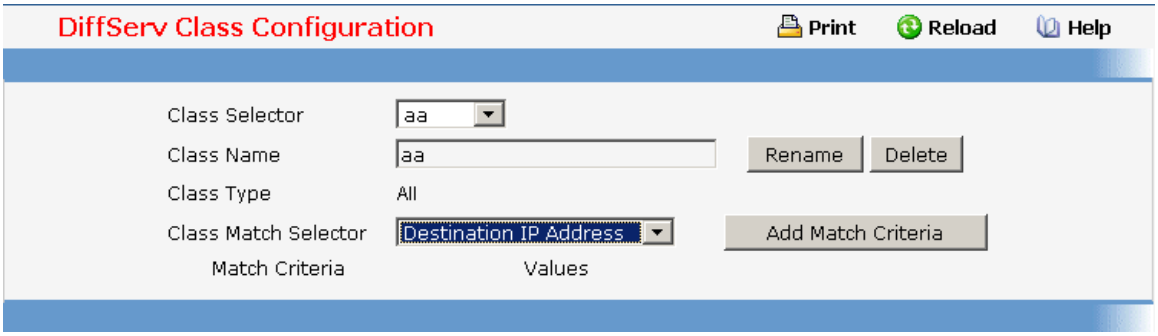
Class Name - This is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying a class. Class name 'default' is reserved and must not be used.

Non-Configurable Data

Class Type - Displays type of the configured class as 'all', 'any', or 'acl'. Only when a new class is created, is this field a selector field. After class creation this becomes a non-configurable field.

Match Criteria - Displays the configured match criteria for the specified class.

Values - Displays the values of the configured match criteria.



Viewing DiffServ Class Summary Page

Non-Configurable Data

Class Name - Displays names of the configured DiffServ classes.

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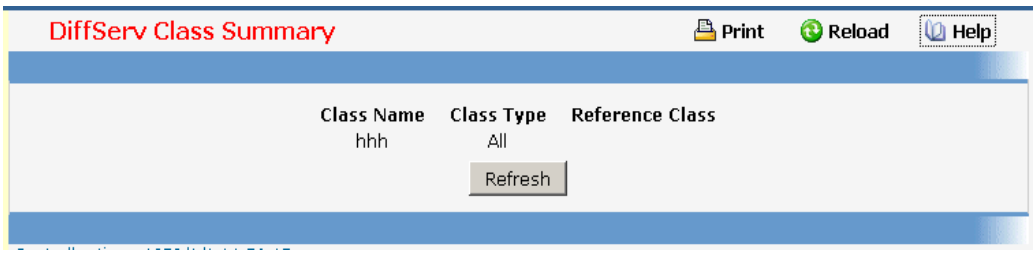
Class Type - Displays types of the configured classes as 'all', 'any', or 'acl'. Class types are platform dependent.

Reference Class/ACL Number - Displays name of the configured class of type 'all' or 'any' referenced by the specified class of the same type. For the specified class type of 'acl', the ACL number attached to the specified class is displayed.



DiffServ Policy Configuration Page

Selection Criteria

Policy Selector - Along with an option to create a new policy, this lists all the existing DiffServ policy names, from which one can be selected. The content of this screen varies based on the selection of this field. If an existing policy is selected then the screen will display Member Classes for that DiffServ policy. If 'create' is selected, another screen appears to facilitate creation of a new policy. The default is 'create'.

Policy Type - *In* indicates the type is specific to inbound traffic direction. Only when a new policy is created, this field is a selector field. After policy creation this becomes a non-configurable field displaying the configured policy type.

Available Class List - This lists all existing DiffServ class names, from which one can be selected. This field is a selector field only when a new policy class instance is to be created. After creation of the policy class instance this becomes a non-configurable field.

Member Class List - This lists all existing DiffServ classes currently defined as members of the specified Policy, from which one can be selected. This list is automatically updated as a new class is added to or removed from the policy. This field is a selector field only when an existing policy class instance is to be removed. After removal of the policy class instance this becomes a non-configurable field.

Configurable Data

Policy Name - This is a case-sensitive alphanumeric string from 1 to 31 characters uniquely identifying a policy.

Non-Configurable Data

Policy Type - *In* indicates the type is specific to inbound traffic direction. Only when a new policy is created, this field is a selector field. After policy creation this becomes a non-configurable field displaying the configured policy type.

Member Class List - Displays all the member classes for the selected DiffServ policy. It is automatically updated as a new class is added to or removed from the policy. Only when an existing policy class instance is to be removed, is this field a selector field. After removal of the policy class instance this becomes a non-configurable field.

Available Class List - Displays all the member classes for the specified policy. It is automatically updated as a new class is added to or removed from the policy. Only when a new policy class instance is to be created is this field a selector field. After creation of the policy class instance this becomes a non-configurable field.

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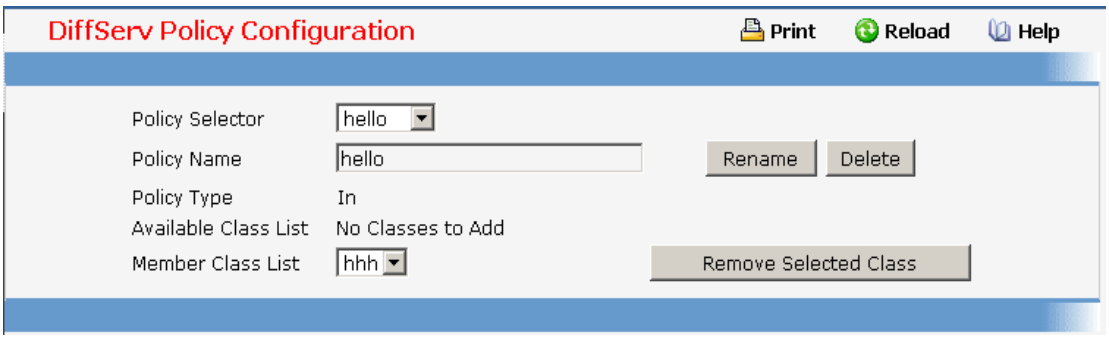


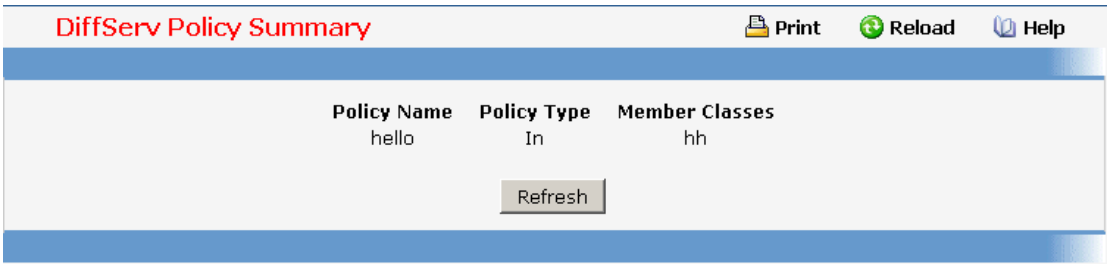
Viewing DiffServ Policy Summary Page

Non-Configurable Data

Policy Name - Displays name of the DiffServ policy.

Policy Type - Displays type of the policy as 'In'.

Member Classes - Displays name of each class instance within the policy.



Configuring DiffServ Policy Class Definition Page

Selection Criteria

Policy Selector - This lists all the existing DiffServ policy names, from which one can be selected.

Member Class List - This lists all existing DiffServ classes currently defined as members of the specified Policy, from which one can be selected. This list is automatically updated as a new class is added to or removed from the policy.

Policy Attribute Selector - This lists all attributes supported for this type of policy, from which one can be selected.

Non-Configurable Data

Policy Type - Displays type of the configured policy as 'In'.

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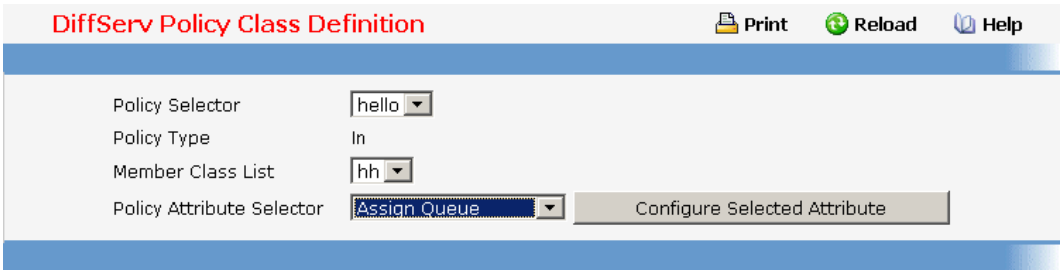


Viewing DiffServ Policy Attribute Summary Page

Non-Configurable Data

Policy Name - Displays name of the specified DiffServ policy.

Policy Type - Displays type of the specified policy as 'In' or 'Out'.

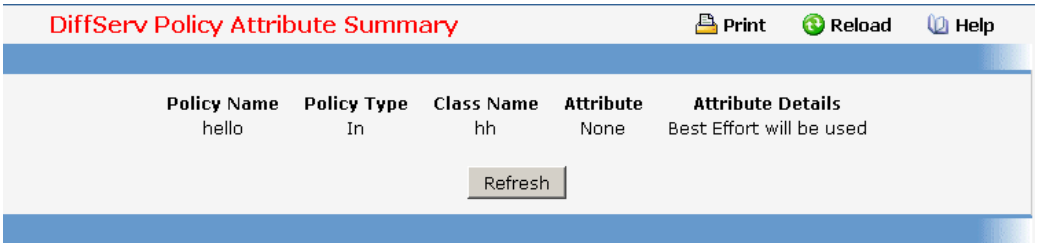
Class Name - Displays name of the DiffServ class to which this policy is attached.

Attribute - Displays the attributes attached to the policy class instances.

Attribute Details - Displays the configured values of the attached attributes.

Command Buttons

Refresh - Refresh the displayed data.



Configuring DiffServ Service Configuration Page

Selection Criteria

Slot/Port - Select the Slot/Port that uniquely specifies an interface. This is a list of all valid slot number and port number combinations in the system. For Read/Write users where 'All' appears in the list, select it to specify all interfaces.

Direction - Select the traffic direction of this service interface. This selection is only available to Read/Write users when Slot/Port is specified as 'All'.

Configurable Data

Policy In - This lists all the policy names of type 'In' from which one can be selected. If 'none' is selected, this will detach the policy from the interface in this direction. This field is not shown for Read/Write users where inbound service policy attachment is not supported by the platform.

Non-Configurable Data

This information is only displayed when Slot/Port is specified as 'All'.

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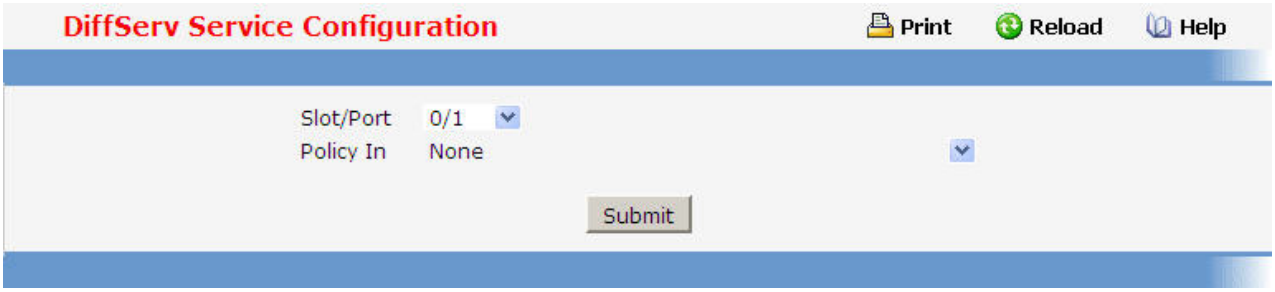
Slot/Port - Shows the Slot/Port that uniquely specifies an interface.

Direction - Shows the traffic direction of this service interface.

Oper. Status - Shows the operational status of this service interface, either Up or Down.

Policy Name - Shows the name of the attached policy.



Viewing DiffServ Service Summary Page

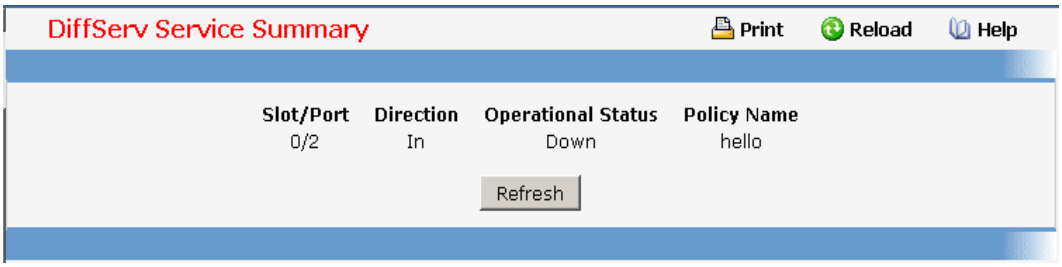
Non-Configurable Data

Slot/Port - Shows the Slot/Port that uniquely specifies an interface.

Direction - Shows the traffic direction of this service interface, either In or Out.

Oper. Status - Shows the operational status of this service interface.

Policy Name - Shows the name of the attached policy.



Viewing DiffServ Service Statistics Page

This screen displays service-level statistical information in tabular form for all interfaces in the system to which a DiffServ policy has been attached in the inbound and/or outbound traffic directions. Use the 'Counter Mode Selector' to specify the counter display mode as either octets or packets (the default).

Selection Criteria

Counter Mode Selector - Specifies the format of the displayed counter values, which must be either Octets or Packets. The default is 'Packets'.

Non-Configurable Data

Slot/Port - Shows the Slot/Port that uniquely specifies an interface.

Direction - Shows the traffic direction of this service interface.

Operational Status - Shows the operational status of this service interface, either Up or Down.

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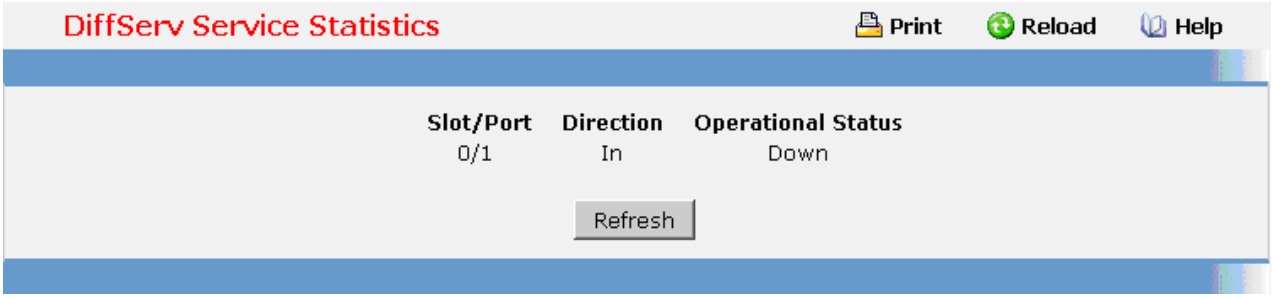


Viewing DiffServ Service Detailed Statistics Page

This screen displays class-oriented statistical information for the policy, which is specified by the interface and direction. The 'Member Classes' drop down list is populated on the basis of the specified interface and direction and hence the attached policy (if any). Highlighting a member class name displays the statistical information for the policy-class instance for the specified interface and direction.

Selection Criteria

Counter Mode Selector - Specifies the format of the displayed counter values, which must be either Octets or Packets. The default is 'Packets'.

Slot/Port - List of all valid slot number and port number combinations in the system that have a DiffServ policy currently attached (in either direction), from which one can be chosen.

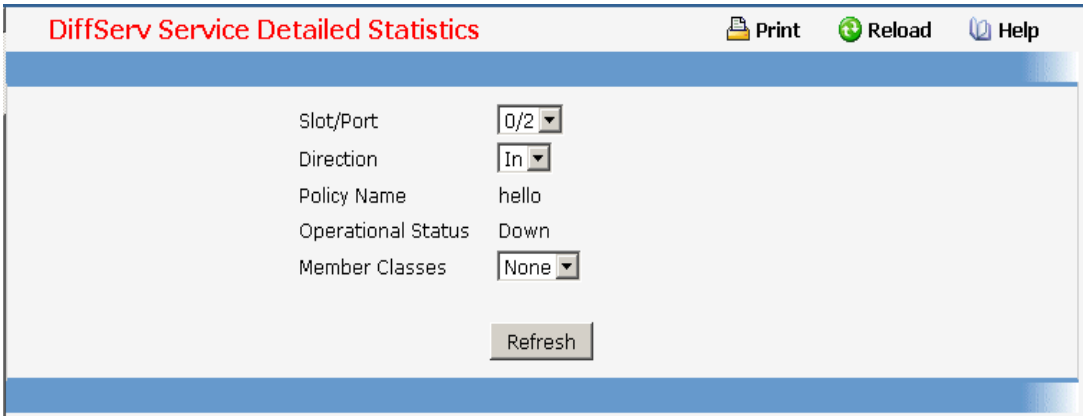
Direction - List of the traffic direction of interface. Only shows the direction(s) for which a DiffServ policy is currently attached.

Member Classes - List of all DiffServ classes currently defined as members of the selected Policy Name. Choose one member class name at a time to display its statistics. If no class is associated with the chosen policy then nothing will be populated in the list.

Non-Configurable Data

Policy Name - Name of the policy currently attached to the specified interface and direction.

Operational Status - Operational status of the policy currently attached to the specified interface and direction. The value is either Up or Down.



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8.2.5.3 **Configuring Diffserv Wizard Page**

Operation

The DiffServ Wizard enables DiffServ on the switch by creating a traffic class, adding the traffic class to a policy, and then adding the policy to the ports selected on DiffServ Wizard page. The DiffServ Wizard will:

Create a DiffServ Class and define match criteria used as a filter to determine if incoming traffic meets the requirements to be a member of the class.

Set the DiffServ Class match criteria based on Traffic Type selection as below:

VOIP - sets match criteria to UDP protocol.

HTTP - sets match criteria to HTTP destination port.

FTP - sets match criteria to FTP destination port.

Telnet - sets match criteria to Telnet destination port.

Any - sets match criteria to all traffic.

Create a DiffServ Policy and adds the DiffServ Policy to the DiffServ Class created.

If Policing is set to YES, then DiffServ Policy style is set to Simple. Traffic which conforms to the Class Match criteria will be processed according to the Outbound Priority selection. Outbound Priority configures the handling of conforming traffic as below:

High - sets policing action to markdscp ef.

Med - sets policing action to markdscp af31.

Low - sets policing action to send.

If Policing is set to NO, then all traffic will be marked as specified below:

High - sets policy mark ipdscp ef.

Med - sets policy mark ipdscp af31.

Low - sets policy mark ipdscp be.

Each port selected will be added to the policy created.

Selection Criteria

Traffic Type - Traffic type is used to define the DiffServ Class. Traffic type options: VOIP, HTTP, FTP, Telnet, and Any.

Ports - List the ports which can be configured to support a DiffServ policy. The DiffServ policy will be added to selected ports.

Policing - Enabling policing will add policing to the DiffServ Policy and the policing rate will be applied.

Committed Rate - When Policing is enabled, the committed rate will be applied to the policy and the policing action is set to conform. When Policing is disabled, the committed rate is not applied and the policy is set to markdscp.

Outbound Priority - When Policing is enabled, Outbound Priority defines the type of policing conform action where: High sets action to markdscp ef, Med sets action to markdscp af31, and Low sets action to send. When Policing is disabled, Outbound Priority defines the policy where: High sets policy to mark ipdscp ef, Med sets policy to mark ipdscp af31, Low set policy to mark ipdscp be.

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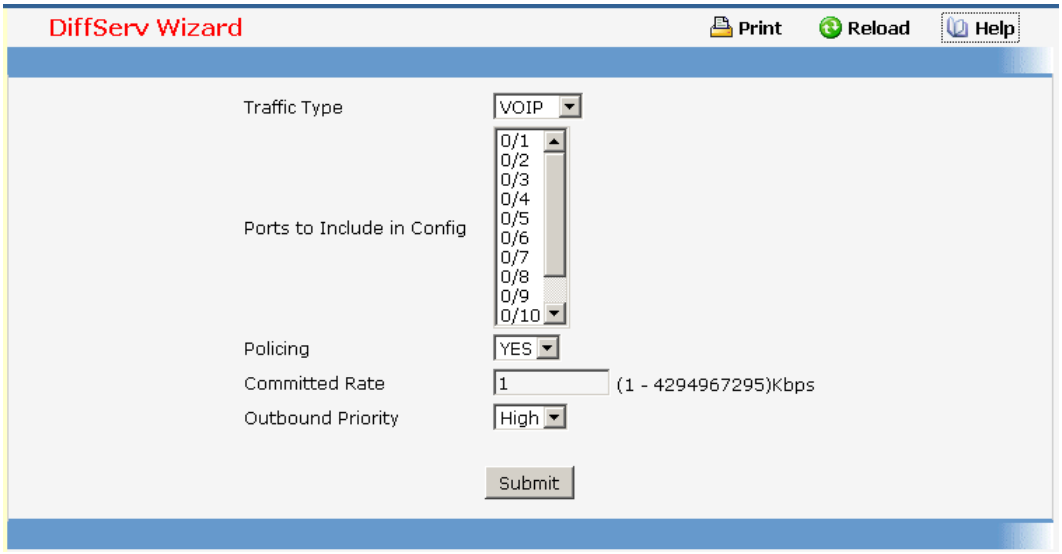

8.2.5.4 **Managing Class of Service**

Managing Table Configuration Page

Selection Criteria

Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

Configurable Data

Interface Trust Mode - Specifies whether or not to trust a particular packet marking at ingress. Interface Trust Mode can only be one of the following:

- ***untrusted***
- ***trust dot1p***
- ***trust ip-precedence***

Default value is trust dot1p.

IP Precedence Traffic Class - Specify which internal traffic class to map the corresponding IP Precedence value. Valid Range is (0 to 6) .

Non-Configurable Data

Untrusted Traffic Class - Displays traffic class (i.e. queue) to which all traffic is directed when in 'untrusted' mode. Valid Range is (0 to 6).

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Non-IP Traffic Class - Displays traffic class (i.e. queue) to which all non-IP traffic is directed when in 'trust ip-precedence' or 'trust ip-dscp' mode. Valid Range is (0 to 6).

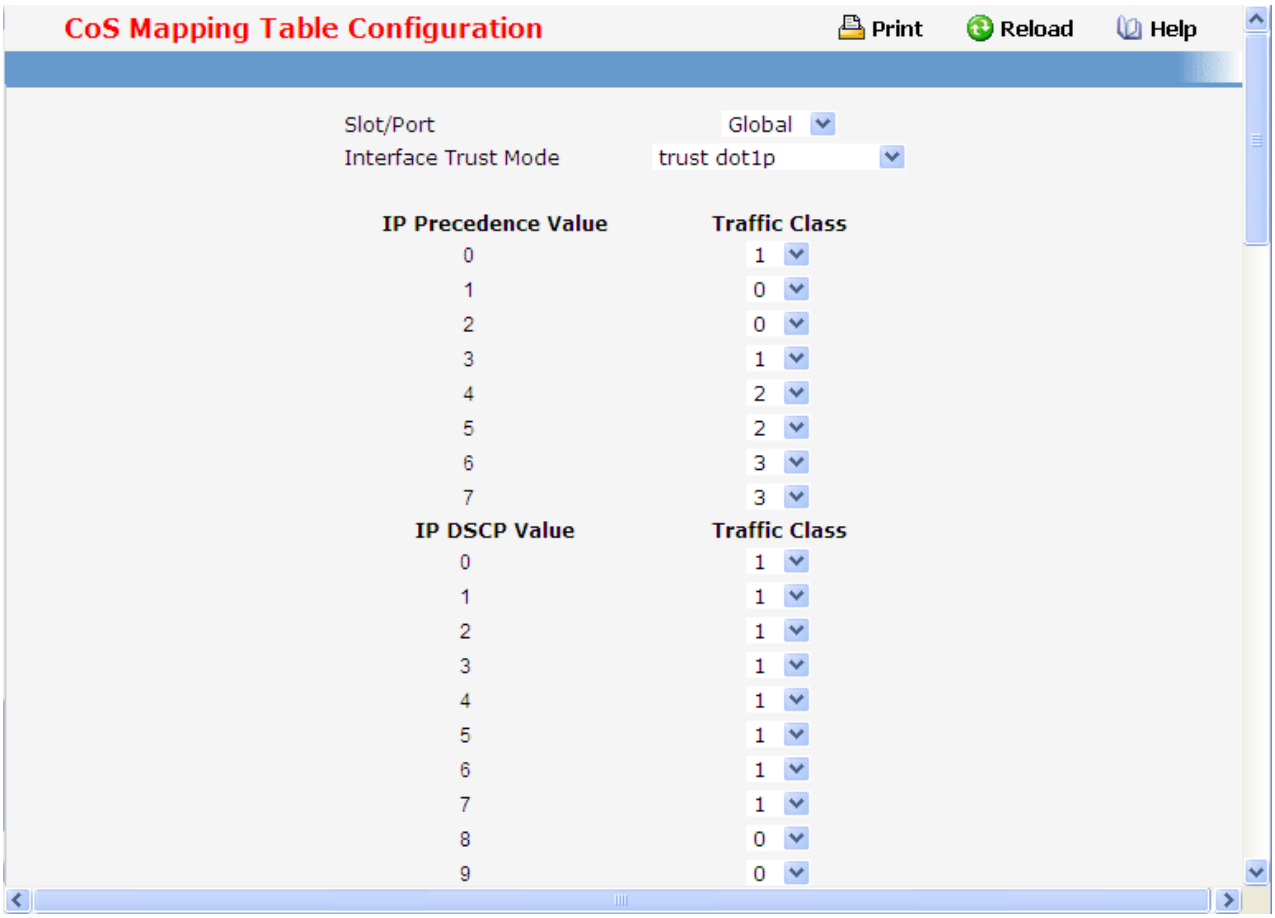
802.1p Priority - Displays the 802.1p priority to be mapped.

IP Precedence Value - Displays IP Precedence value. Valid Range is (0 to 7).

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Restore Defaults - Restores default settings.



Configuring CoS interface

Selection Criteria

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Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

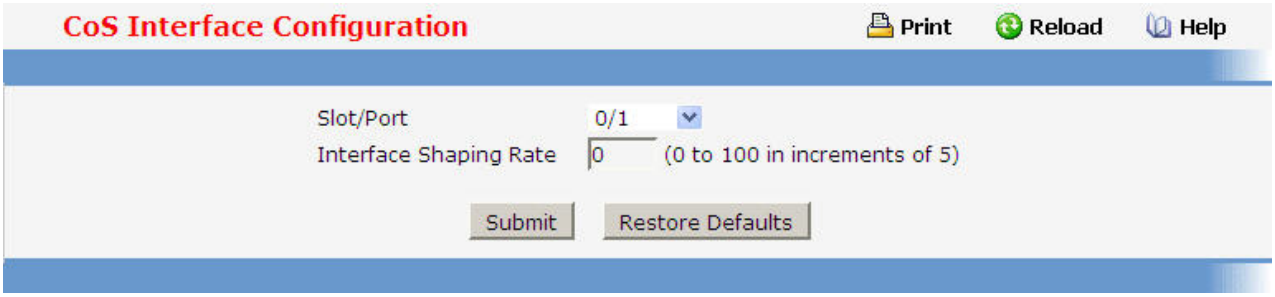
Configurable Data

Interface Shaping Rate - Specifies the maximum bandwidth allowed, typically used to shape the outbound transmission rate. This value is controlled independently of any per-queue maximum bandwidth configuration. It is effectively a second-level shaping mechanism. Default value is 0. Valid Range is (0 to 100) in increments of 5 . The value 0 means maximum is unlimited.

Command Buttons

Restore Defaults - Restores default settings.

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Configuring CoS interface queue

Selection Criteria

Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

Queue ID - Specifies all the available queues per interface(platform based).

Configurable Data

Minimum Bandwidth Allocated - Specifies the sum of individual Minimum Bandwidth values for all queues in the interface. The sum cannot exceed the defined maximum (100). This value is considered while configuring the Minimum Bandwidth for a queue in the selected interface.

Minimum Bandwidth - Specifies the minimum guaranteed bandwidth allotted to this queue. Setting this value higher than its corresponding Maximum Bandwidth automatically increases the maximum to the same value. Default value is 0. Valid Range is (0 to 100) in increments of 5 . The value 0 means no guaranteed minimum. Sum of individual Minimum Bandwidth values for all queues in the selected interface cannot exceed defined maximum (100).

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Scheduler Type - Specifies the type of scheduling used for this queue.
Scheduler Type can only be one of the following:

- ***strict***
- ***weighted***

Default value is weighted.

Queue Management Type - Queue depth management technique used for queues on this interface. This is only used if device supports independent settings per-queue.
Queue Management Type can only be:

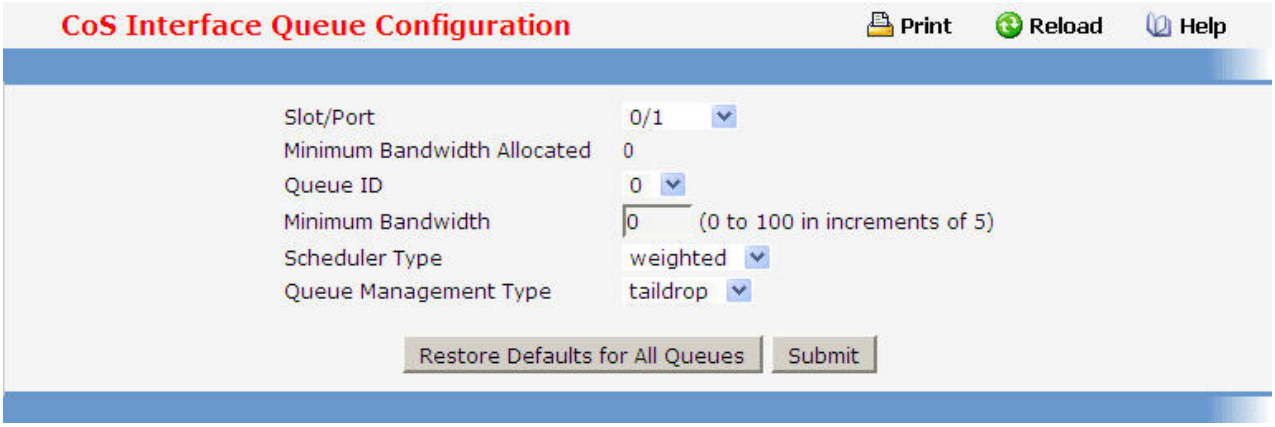
- ***taildrop***

Default value is taildrop.

Command Buttons

Restore Defaults for All Queues - Restores default settings for all queues on the selected interface.

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Viewing CoS interface queue status

Selection Criteria

Slot/Port - Specifies all CoS configurable interfaces. The option "Global" represents the most recent global configuration settings. These may be overridden on a per-interface basis.

Non-Configurable Data

Queue ID - Specifies the queueID.

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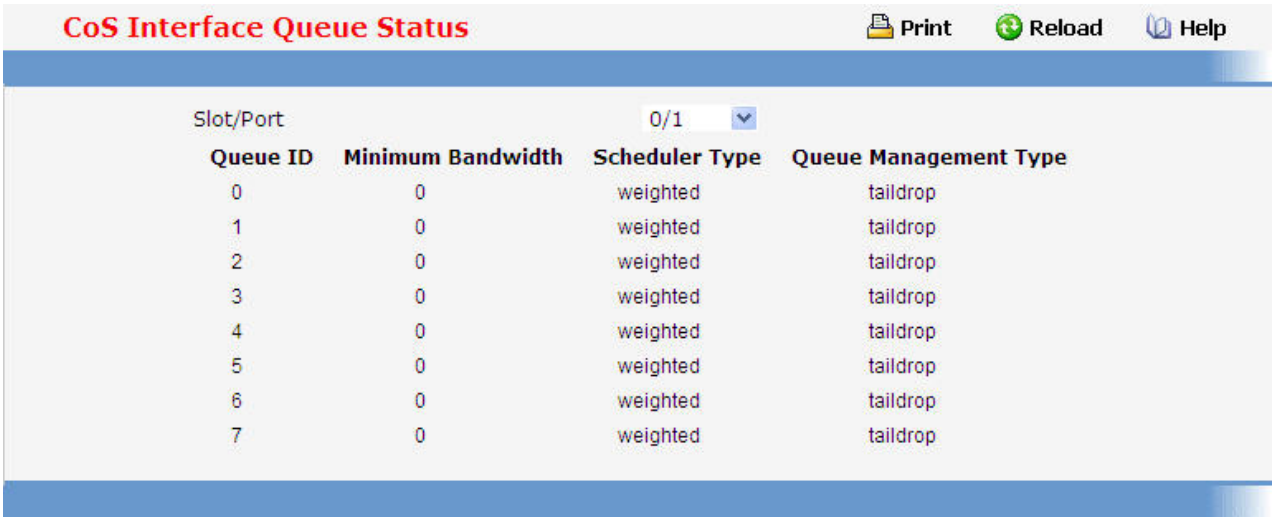
Minimum Bandwidth - Specifies the minimum guaranteed bandwidth allotted to this queue. The value 0 means no guaranteed minimum. Sum of individual Minimum Bandwidth values for all queues in the selected interface cannot exceed defined maximum (100).

Scheduler Type - Specifies the type of scheduling used for this queue.
Scheduler Type can only be one of the following:

- ***strict***
- ***weighted***

Queue Management Type - Queue depth management technique used for queues on this interface. This is only used if device supports independent settings per-queue.
Queue Management Type can only be one of the following:

- ***taildrop***



8.2.6 *IP Multicast Menu*

8.2.6.1 **Managing DVMRP Protocol**

Configuring DVMRP Global Configuration Page

Configurable Data

Admin Mode - Select enable or disable from the dropdown menu. This sets the administrative status of DVMRP to active or inactive. The default is disable.

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Non-Configurable Data

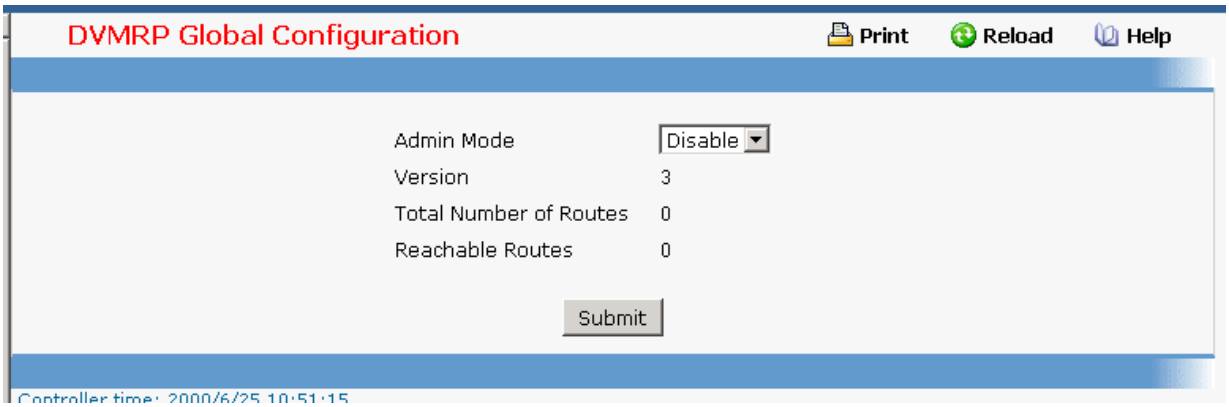
Version - The current value of the DVMRP version string.

Total Number of Routes - The number of routes in the DVMRP routing table.

Reachable Routes - The number of routes in the DVMRP routing table that have a non-infinite metric.

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Configuring DVMRP Interface Configuration Page

Selection Criteria

Slot/Port - Select the interface for which data is to be configured. You must configure at least one router interface before you configure a DVMRP interface. Otherwise you will see a message telling you that no router interfaces are available, and the configuration screen will not be displayed.

Configurable Data

Interface Mode - Select enable or disable from the pull-down menu to set the administrative mode of the selected DVMRP routing interface.

Interface Metric - Enter the DVMRP metric for the selected interface. This value is sent in DVMRP messages as the cost to reach this network. Valid values are from (1 to 31).

Command Buttons

Submit - Send the updated configuration to the switch. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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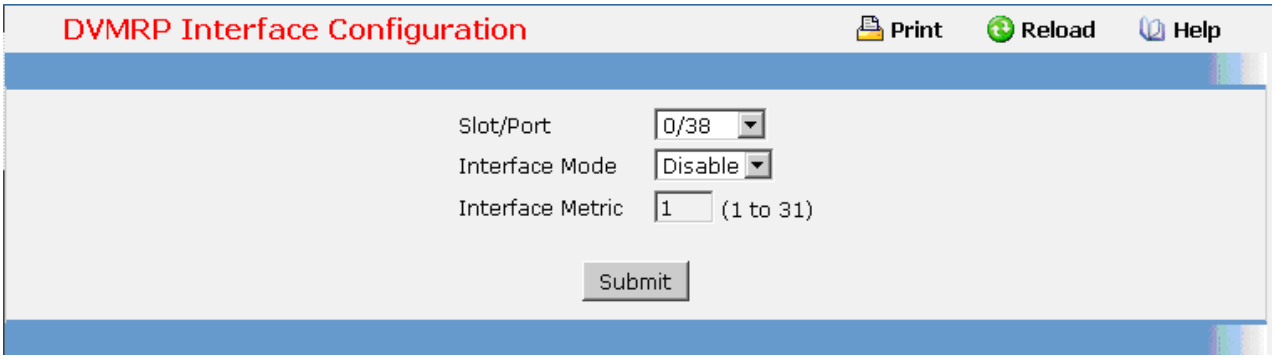

Viewing DVMRP Configuration Summary

Selection Criteria

- **Slot/Port** - Select the interface for which data is to be displayed. You must configure at least one router interface before you can display data for a DVMRP interface. Otherwise you will see a message telling you that no router interfaces are available, and the configuration summary screen will not be displayed.

Non-Configurable Data

Interface Mode - The administrative mode of the selected DVMRP routing interface, either enable or disable.

Protocol State - The operational state of the DVMRP protocol on the selected interface, either operational or non-operational.

Local Address - The IP address used as a source address in packets sent from the selected interface.

Interface Metric - The metric used to calculate distance vectors for the selected interface.

Generation ID - The DVMRP generation ID used by the router for the selected interface. This value is reset every time an interface is (re)started and is placed in prune messages. A change in generation ID informs the neighbor routers that any previous information about this router should be discarded.

Received Bad Packets - The number of invalid packets received on the selected interface.

Received Bad Routes - The number of invalid routes received on the selected interface.

Sent Routes - The number of routes sent on the selected interface.

Neighbor IP - The IP address of the neighbor whose information is displayed.

State - The state of the specified neighbor router on the selected interface, either active or down.

Neighbor Uptime - The DVMRP uptime for the specified neighbor on the selected interface. This is the time since the neighbor entry was learned.

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Neighbor Expiry Time - The DVMRP expiry time for the specified neighbor on the selected interface. This is the time left before this neighbor entry will age out, and is not applicable if the neighbor router's state is down.

Generation ID - The DVMRP generation ID for the specified neighbor on the selected interface.

Major Version - The DVMRP Major Version for the specified neighbor on the selected interface.

Minor Version - The DVMRP Minor Version for the specified neighbor on the selected interface.

Capabilities - The DVMRP capabilities of the specified neighbor on the selected interface.

Received Routes - The number of routes received for the specified neighbor on the selected interface.

Received Bad Packets - The number of invalid packets received for the specified neighbor on the selected interface.

Received Bad Routes - The number of invalid routes received for the specified neighbor on the selected interface.

Command Buttons

Refresh - Refresh the screen with the new data.

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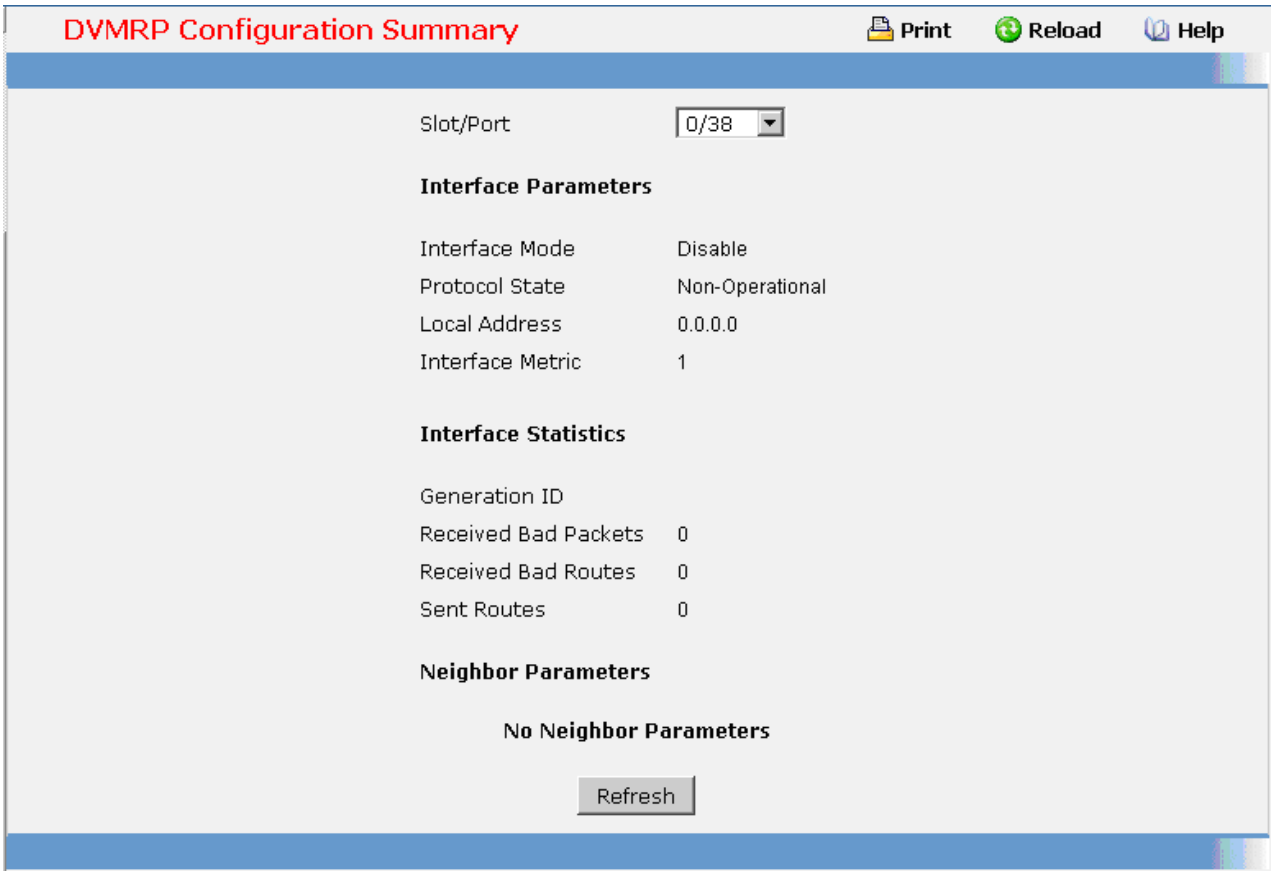

Viewing DVMRP Next Hop Configuration Summary

Non-Configurable Data

Source IP - The IP address used with the source mask to identify the source network for this table entry.

Source Mask - The network mask used with the source IP address.

Next Hop Interface - The outgoing interface for this next hop.

Type - The next hop type. 'Leaf' means that no downstream dependent neighbors exist on the outgoing interface. Otherwise, the type is 'branch'.

Command Buttons

Refresh - Refresh the screen with the new data

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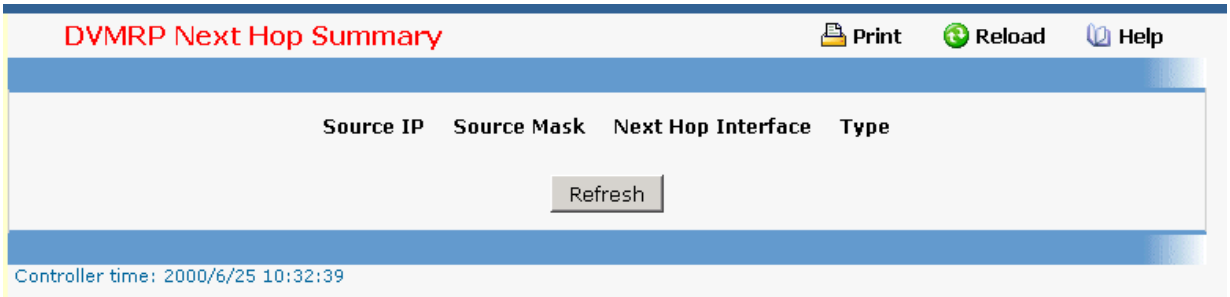


Viewing DVMRP Prune Summary

Non-Configurable Data

Group IP - The group address which has been pruned.

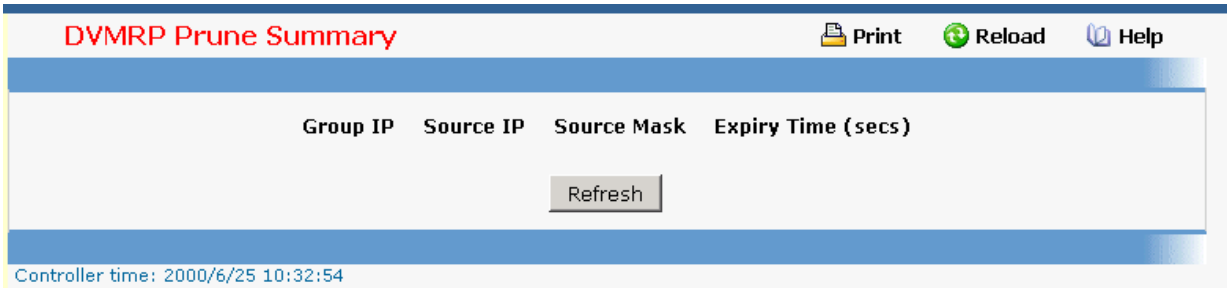
Source IP - The address of the source or source network which has been pruned.

Source Mask - The subnet mask to be combined with the source IP address to identify the source or source network which has been pruned.

Expiry Time - The amount of time remaining before this prune should expire at the upstream neighbor. If no prune messages have been received from downstream neighbors, this is set to value of the default prune lifetime timer, otherwise it is set to the smallest received value or the default timer, whichever is less.

Command Buttons

Refresh - Refresh the screen with the new data



Viewing DVMRP Route Summary

Non-Configurable Data

Source Address - The network address that is combined with the source mask to identify the sources for this entry.

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Source Mask - The subnet mask to be combined with the source address to identify the sources for this entry.

Upstream Neighbor - The address of the upstream neighbor (e.g., RPF neighbor) from which IP datagrams from these sources are received.

Interface - The interface on which IP datagrams sent by these sources are received. A value of 0 typically means the route is an aggregate for which no next-hop interface exists.

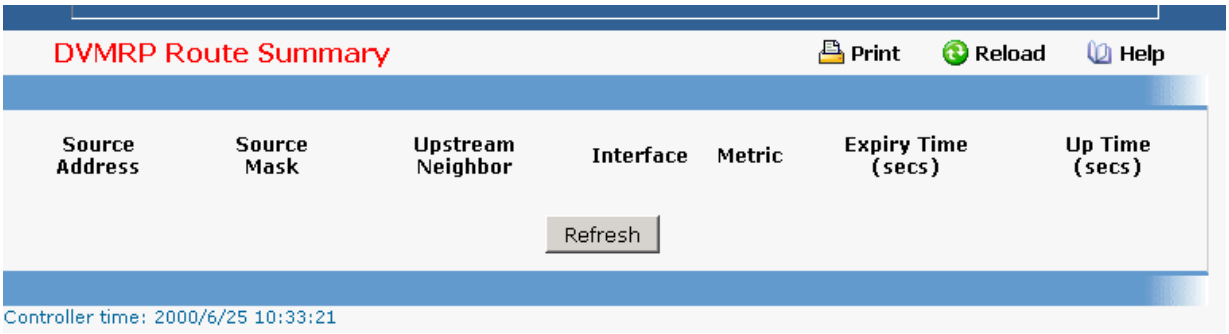
Metric - The distance in hops to the source subnet.

Expiry Time - The minimum amount of time remaining before this entry will be aged out.

Up Time - The time since the route represented by this entry was learned by the router.

Command Buttons

Refresh - Refresh the screen with the new data



8.2.6.2 **Managing IGMP Protocol**

Configuring IGMP Global Configuration Page

Configurable Data

Admin Mode - Select enable or disable from the pulldown menu to set the administrative status of IGMP in the router to active or inactive. The default is disable.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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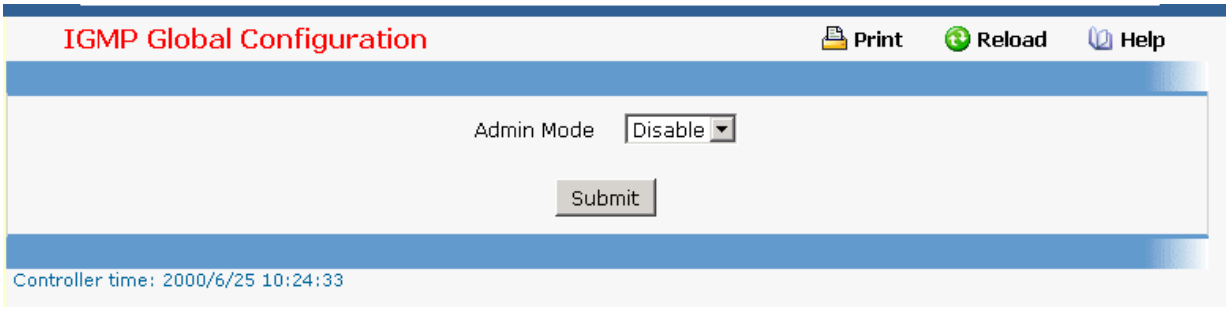

Configuring IGMP Interface Configuration Page

Selection Criteria

Slot/Port - Select the slot and port for which data is to be displayed or configured from the pulldown menu. Slot 0 is the base unit. You must have configured at least one router interface before configuring or displaying data for an IGMP interface, otherwise an error message will be displayed.

Configurable Data

Interface Mode - Select enable or disable from the pulldown menu to set the administrative status of IGMP on the selected interface. The default is disable.

Version - Enter the version of IGMP you want to configure on the selected interface. Valid values are 1 to 3 and the default value is 3.

Robustness - Enter the robustness value. This variable allows tuning for the expected packet loss on a subnet. If you expect the subnet to be lossy, you should enter a higher number for this parameter. IGMP is robust to (robustness variable-1) packet losses. Valid values are from 1 to 255. The default value is 2.

Query Interval - Enter the frequency in seconds at which IGMP host-query packets are to be transmitted on this interface. Valid values are from 1 to 3600. The default value is 125.

Query Max Response Time - Enter the maximum query response time to be advertised in IGMPv2 queries on this interface, in tenths of a second. The default value is 100. Valid values are from (0 to 255) .

Startup Query Interval - Enter the number of seconds between the transmission of startup queries on the selected interface. The valid values are from 1 to 300. The default value is 31.

Startup Query Count - Enter the number of queries to be sent on startup. The valid values are from 1 to 20. The default value is 2.

Last Member Query Interval - Enter the last member query interval in tenths of a second. This the maximum response time to be inserted into group-specific queries sent in response to leave group messages, and is also the amount of time between group-specific query messages. Valid values are from 0 to 255. The default value is 10. This value is not used for IGMP version 1.

Last Member Query Count - Enter the number of queries to be sent on receiving a leave group report. Valid values are from 1 to 20. The default value is 2.

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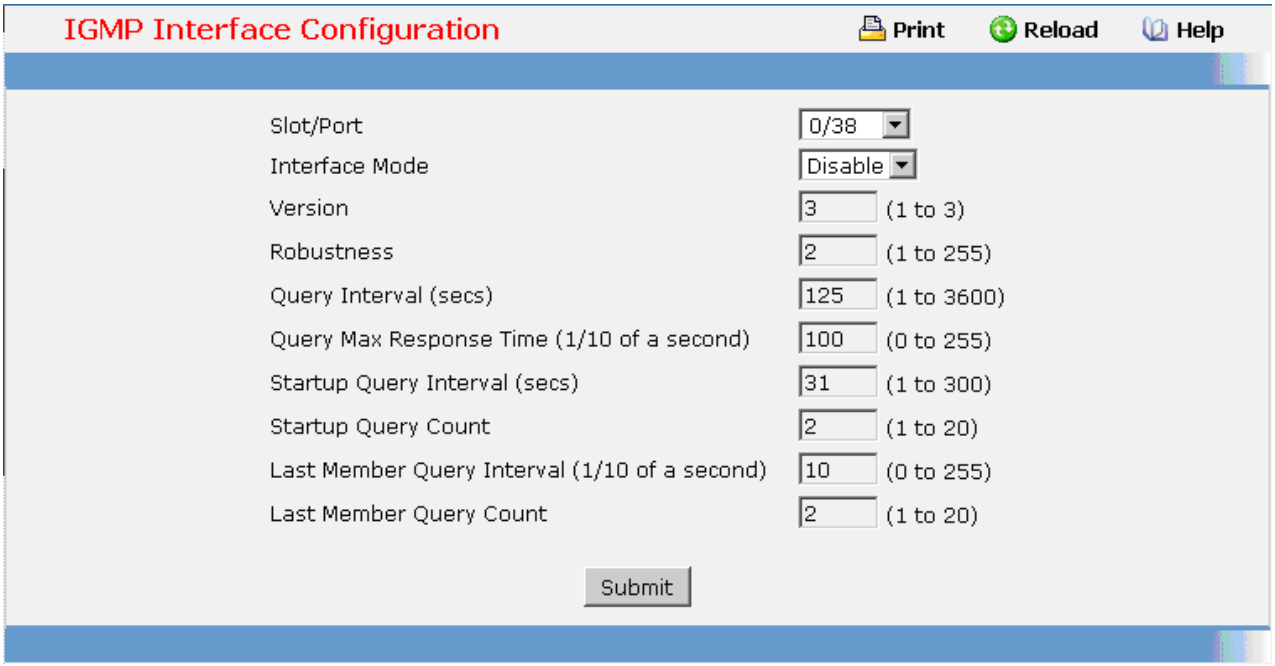
Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Viewing IGMP Configuration Summary

Selection Criteria

Slot/Port - Select the slot and port for which data is to be displayed. Slot 0 is the base unit.

Non-Configurable Data

Interface Mode - The administrative status of IGMP on the selected interface.

IP Address - The IP address of the selected interface.

Subnet Mask - The subnet mask for the IP address of the selected interface.

Protocol State - The operational state of IGMP on the selected interface.

Version - The version of IGMP configured on the selected interface.

Query Interval - The frequency at which IGMP host-query packets are transmitted on the selected interface.

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Query Max Response Time - The maximum query response time advertised in IGMPv2 queries sent from the selected interface.

Robustness - The robustness parameter for the selected interface. This variable allows tuning for the expected packet loss on a subnet. If a subnet is expected to be lossy, the robustness variable may be increased. IGMP is robust to (robustness variable-1) packet losses.

Startup Query Interval - The interval at which startup queries are sent on the selected interface.

Startup Query Count - The number of queries to be sent on startup.

Last Member Query Interval - The last member query interval. The last member query interval is the maximum response time inserted into group-specific queries sent in response to leave group messages, and is also the amount of time between group-specific query messages. This value may be tuned to modify the leave latency of the network. A reduced value results in reduced time to detect the loss of the last member of a group. This value is not used for IGMP version 1.

Last Member Query Count - The number of queries to be sent on receiving a leave group report.

Querier - The address of the IGMP querier on the IP subnet to which the selected interface is attached.

Querier Status - Indicates whether the selected interface is in querier or non querier mode.

Querier Up Time - The time in seconds since the IGMP interface querier was last changed.

Querier Expiry Time - The time in seconds remaining before the other querier present timer expires. If the local system is the querier, this will be zero.

Wrong Version Queries - The number of queries that have been received on the selected interface with an IGMP version that does not match the IGMP version configured for the interface, over the lifetime of the entry. IGMP requires that all routers on a LAN be configured to run the same version of IGMP. Therefore, a configuration error is indicated if any queries are received with the wrong version number.

Number of Joins - The number of times a group membership has been added on the selected interface; that is, the number of times an entry for this interface has been added to the cache table. This gives an indication of the amount of IGMP activity on the interface.

Number of Groups - The current number of entries for the selected interface in the cache table.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.

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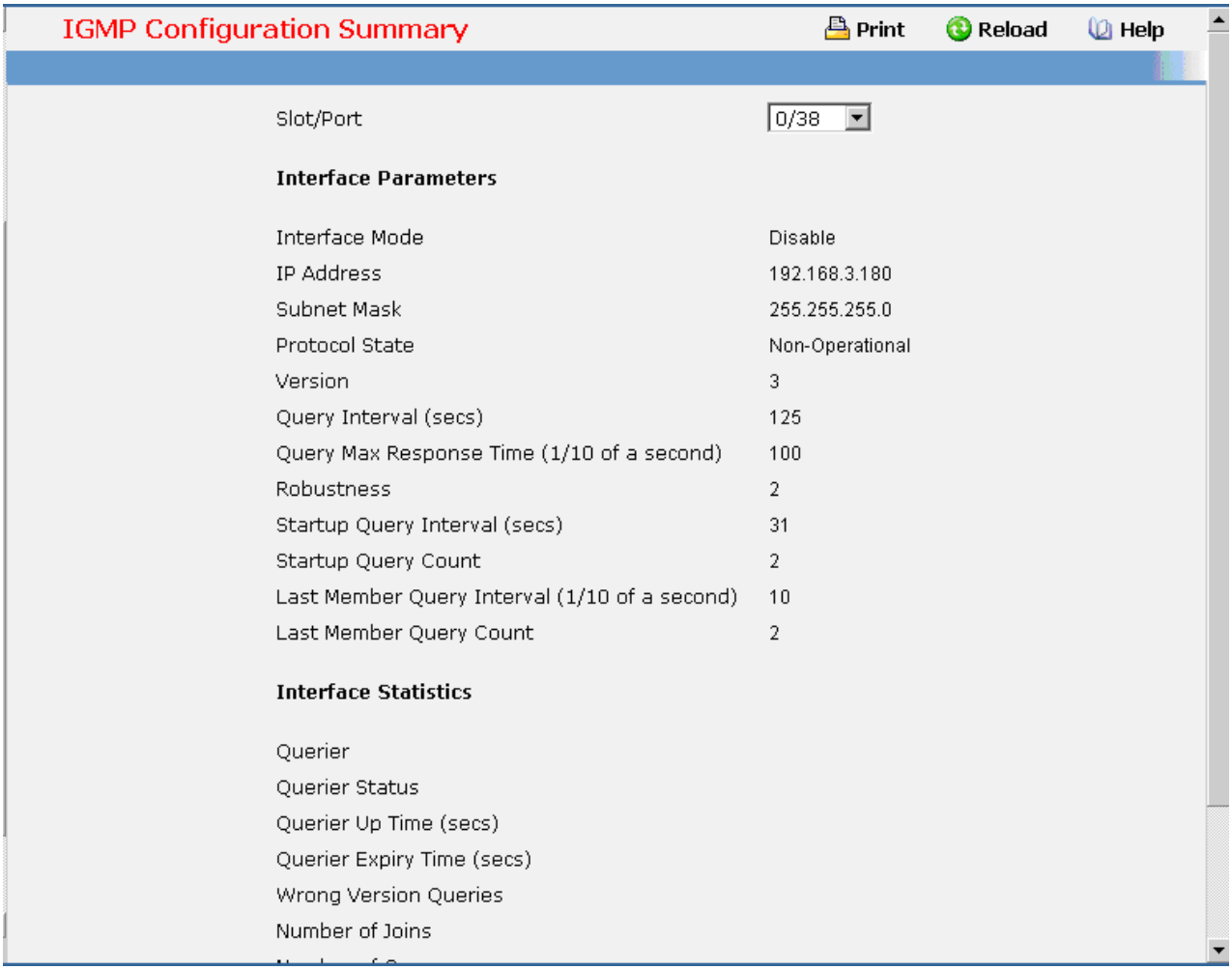

Viewing IGMP Cache Information

Selection Criteria

Slot/Port - Select the Slot and port for which data is to be displayed. Slot 0 is the base unit.

Multicast Group IP - Select the IP multicast group address for which data is to be displayed. If no group membership reports have been received on the selected interface you will not be able to make this selection, and none of the non-configurable data will be displayed.

Non-Configurable Data

Last Reporter - The IP address of the source of the last membership report received for the IP Multicast group address on the selected interface.

Up Time - The time elapsed since this entry was created.

Expiry Time - The minimum amount of time remaining before this entry will be aged out.

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Version 1 Host Timer - The time remaining until the local router will assume that there are no longer any IGMP version 1 members on the IP subnet attached to this interface. When an IGMPv1 membership report is received, this timer is reset to the group membership timer. While this timer is non-zero, the local router ignores any IGMPv2 leave messages for this group that it receives on the selected interface. This field is displayed only if the interface is configured for IGMP version 1.

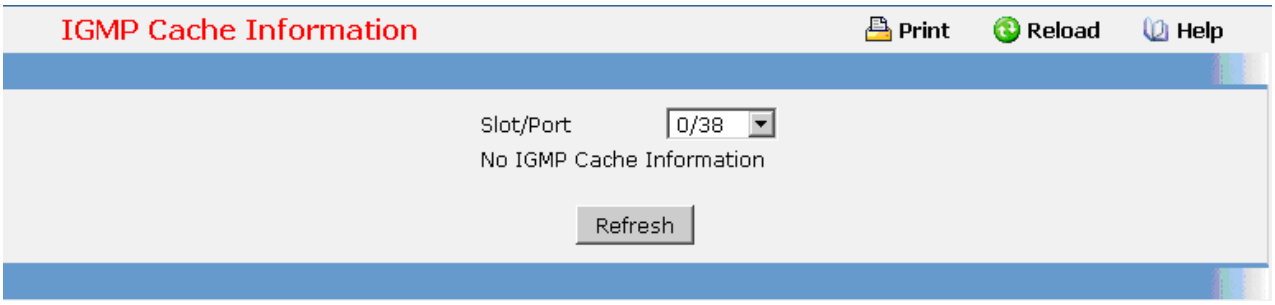
Version 2 Host Timer - The time remaining until the local router will assume that there are no longer any IGMP version 2 members on the IP subnet attached to this interface. When an IGMPv2 membership report is received, this timer is reset to the group membership timer. While this timer is non-zero, the local router ignores any IGMPv1 and IGMPv3 leave messages for this group that it receives on the selected interface. This field is displayed only if the interface is configured for IGMP version 2.

Compatibility - This parameter shows group compatibility mode (v1, v2 and v3) for this group on the specified interface.

Filter Mode - The source filter mode (Include/Exclude/NA) for the specified group on this interface. When NA mode is active the field is blank

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.



Viewing IGMP Interface Membership Details Information

Selection Criteria

Slot/Port - Select the Slot and port for which data is to be displayed. Slot 0 is the base unit.

Multicast Group IP - Select the IP multicast group address for which data is to be displayed. If no group membership reports have been received on the selected interface you will not be able to make this selection, and none of the non-configurable data will be displayed.

Non-Configurable Data

Interface - This parameter shows the interface on which multicast packets are forwarded.

Group Compatibility Mode - This parameter shows group compatibility mode (v1, v2 and v3) for this group on the specified interface.

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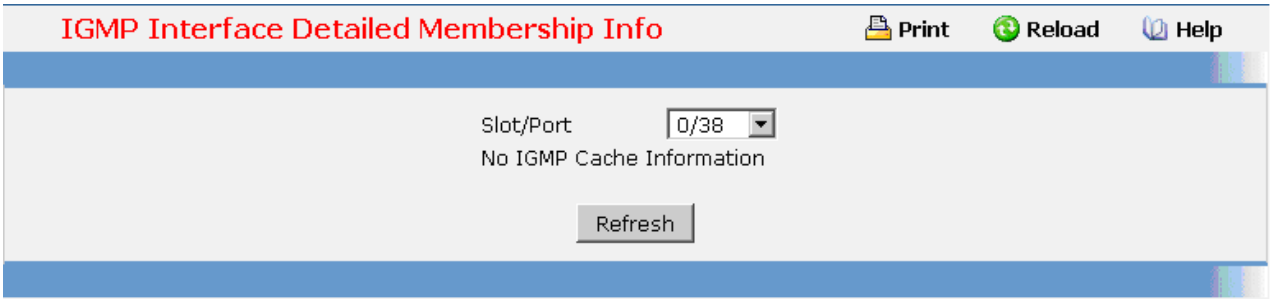
Source Filter Mode - The source filter mode (Include/Exclude/NA) for the specified group on this interface.

Source Hosts - This parameter shows source addresses which are members of this multicast address.

Expiry Time - This parameter shows expiry time interval against each source address which are members of this multicast group. This is the amount of time after which the specified source entry is aged out.



8.2.6.3 **Defining Multicast Configuration**

Configuring Multicast Global Configuration Page

Selection Criteria

Admin Mode - Select enable or disable to set the administrative status of Multicast Forwarding in the router. The default is disabled.

Non-Configurable Data

Protocol State - The operational state of the multicast forwarding module.

Table Maximum Entry Count - The maximum number of entries in the IP Multicast routing table.

Number Of Packets For Which Source Not Found - The number of multicast packets that were supposed to be routed but which failed the RPF check.

Number Of Packets For Which Group Not Found - The number of multicast packets that were supposed to be routed but for which no multicast route was found.

Protocol - The multicast routing protocol presently activated on the router, if any.

Table Entry Count - The number of multicast route entries currently present in the Multicast route table.

Table Highest Entry Count - The highest number of multicast route entries that have been present in the Multicast route table.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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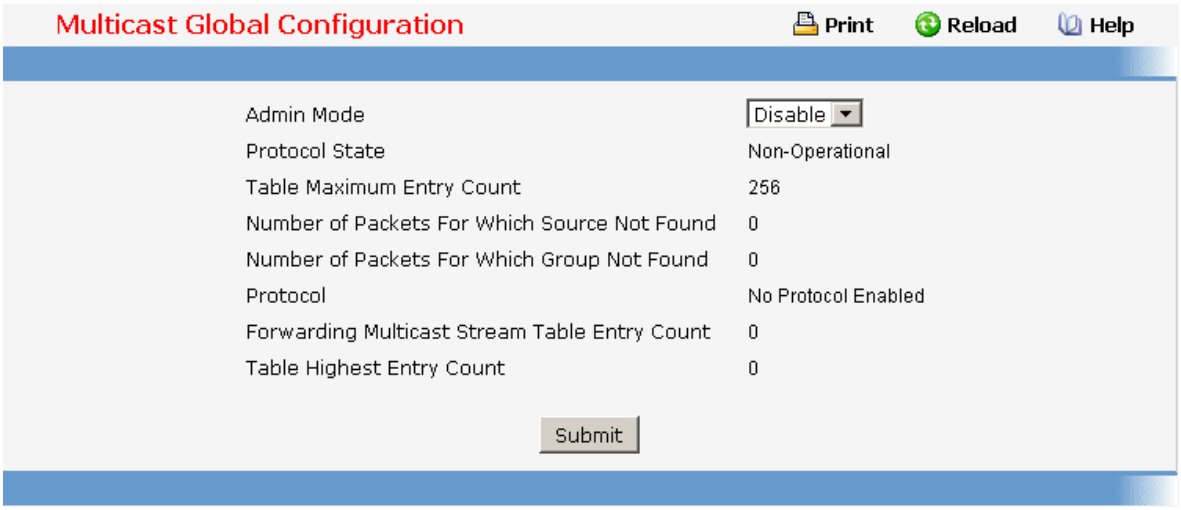


Configuring Interface's Multicast Configuration Page

Selection Criteria

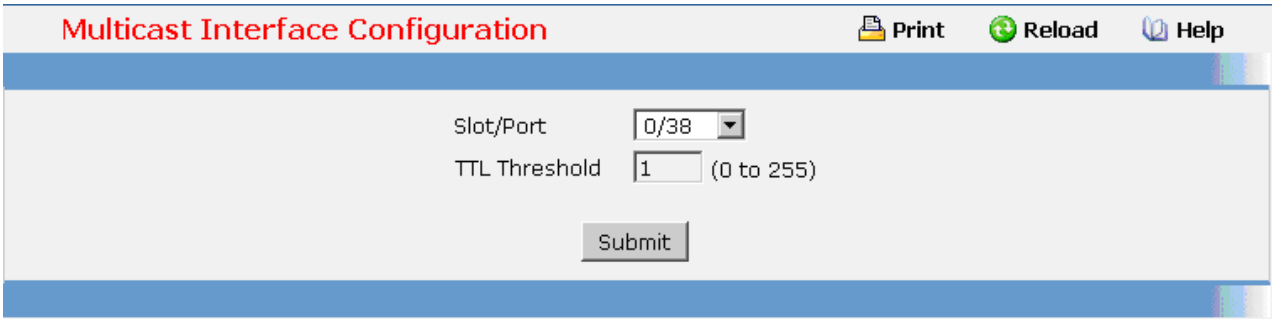
Slot/Port - Select the routing interface you want to configure from the dropdown menu.

Configurable Data

TTL Threshold - Enter the TTL threshold below which a multicast data packet will not be forwarded from the selected interface. You should enter a number between 0 and 255. If you enter 0 all multicast packets for the selected interface will be forwarded. You must configure at least one router interface before you will see this field.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Viewing Multicast MRoute Summary Page

This screen displays selected contents of the Mroute Table in tabular form. If there are no routes in the table you will not be presented with the Selection Criteria.

Selection Criteria

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Source IP - Enter the IP address of the multicast packet source to be combined with the Group IP to fully identify a single route whose Mroute table entry you want to display or clear. You may leave this field blank.

Group IP - Enter the destination group IP address whose multicast route(s) you want to display or clear.

Non-Configurable Data

Incoming Interface - The incoming interface on which multicast packets for this source/group arrive.

Outgoing Interface(s) - The list of outgoing interfaces on which multicast packets for this source/group are forwarded.

Up Time - The time in seconds since the entry was created.

Expiry Time - The time in seconds before this entry will age out and be removed from the table.

RPF Neighbor - The IP address of the Reverse Path Forwarding neighbor.

Protocol - The multicast routing protocol which created this entry. The possibilities are:

PIM-DM

PIM-SM

DVMRP

Flags - The value displayed in this field is valid if the multicast routing protocol running is PIMSM. The possible values are RPT or SPT. For other protocols a "------" is displayed.

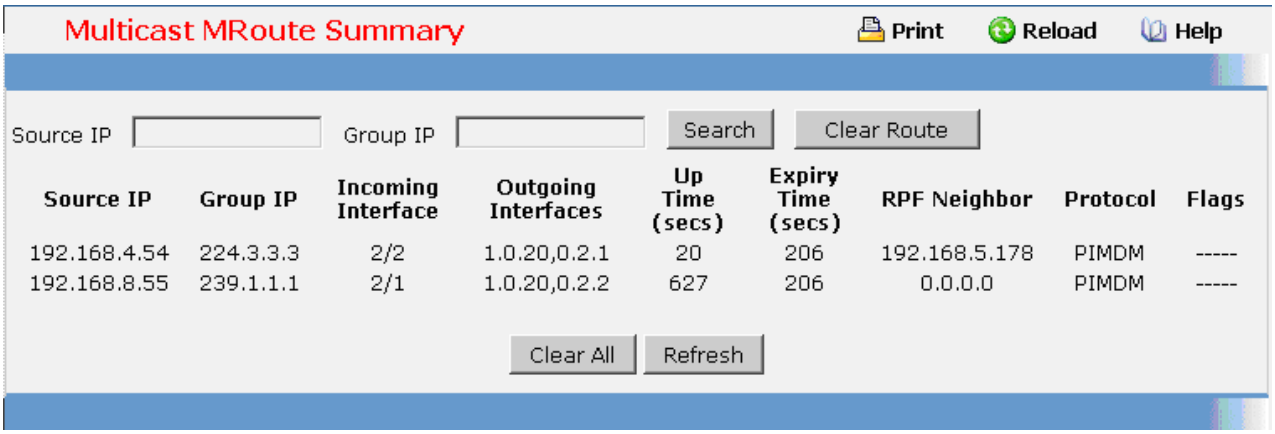
Command Buttons

Search - Search the Mroute table for an entry matching the Source IP (if entered) and Group IP address.

Clear Route - Remove the data on the screen for the Source IP (if entered) and Group IP address you have specified.

Clear All - Remove all the data on the screen.

Refresh - Refresh the information on the screen with the present state of the data in the router.



Configuring Multicast Static Routes Configuration Page

Selection Criteria

Source - Select Create Static Route to configure a new static entry in the MRoute table, or select one of the existing entries from the pulldown menu.

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Configurable Data

Source IP - Enter the IP Address that identifies the multicast packet source for the entry you are creating.

Source Mask - Enter the subnet mask to be applied to the Source IP address.

RPF Neighbor - Enter the IP address of the neighbor router on the path to the source.

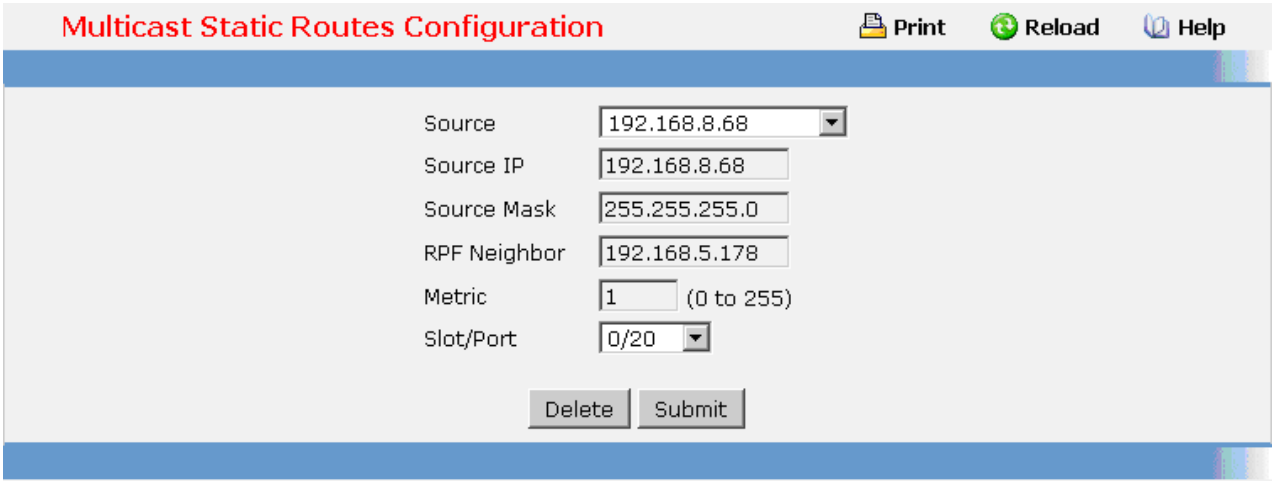
Metric - Enter the link state cost of the path to the multicast source. The range is 0 - 255 and the default is one. You can change the metric for a configured route by selecting the static route and editing this field.

Slot/Port - Select the interface number from the dropdown menu. This is the interface that connects to the neighbor router for the given source IP address.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Delete the static entry with the selected Source IP address from the MRoute table.



Viewing Multicast Static Routes Configuration Page

Non-Configurable Data

Source IP - The IP Address that identifies the multicast packet source for this route.

Source Mask - The subnet mask applied to the Source IP address.

RPF Address - The IP address of the RPF neighbor.

Metric - The link state cost of the path to the multicast source. The range is 0 - 255.

Slot/Port - The number of the incoming interface whose IP address is used as RPF for the given source IP address.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.

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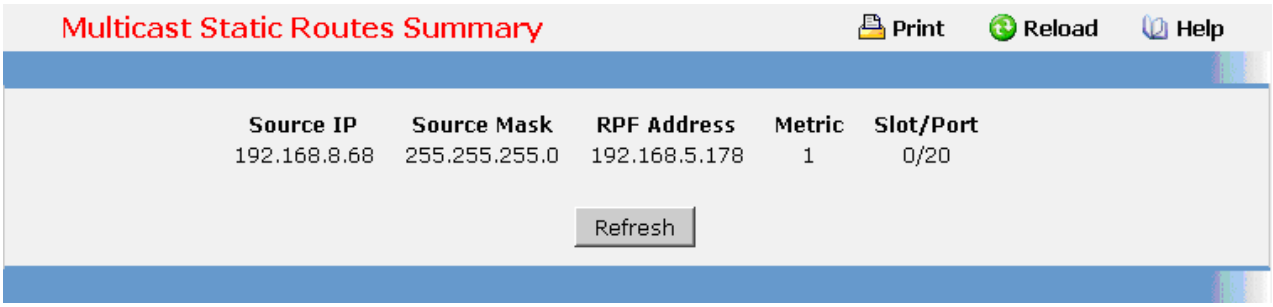


Configuring Multicast Admin Boundary Configuration Page

The definition of an administratively scoped boundary is a mechanism is a way to stop the ingress and egress of multicast traffic for a given range of multicast addresses on a given routing interface.

Selection Criteria

Group IP - Select 'Create Boundary' from the pulldown menu to create a new admin scope boundary, or select one of the existing boundary specifications to display or update its configuration.

Slot/Port - Select the router interface for which the administratively scoped boundary is to be configured.

Configurable Data

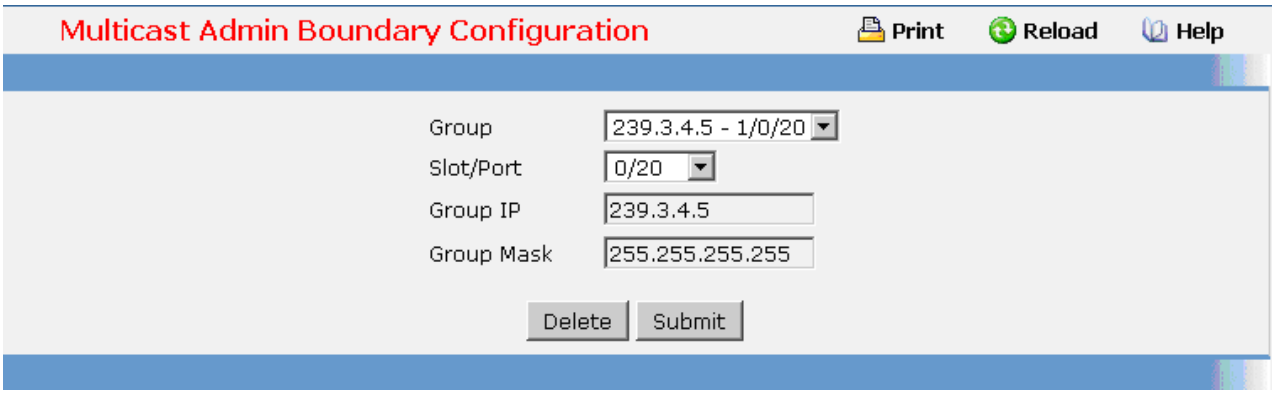
Group IP - Enter the multicast group address for the start of the range of addresses to be excluded. The address must be in the range of 239.0.0.0 through 239.255.255.255.

Group Mask - Enter the mask to be applied to the multicast group address. The combination of the mask and the Group IP gives the range of administratively scoped addresses for the selected interface.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Delete the selected administrative scoped boundary.



Viewing Multicast Admin Boundary Configuration Page

Non-Configurable Data

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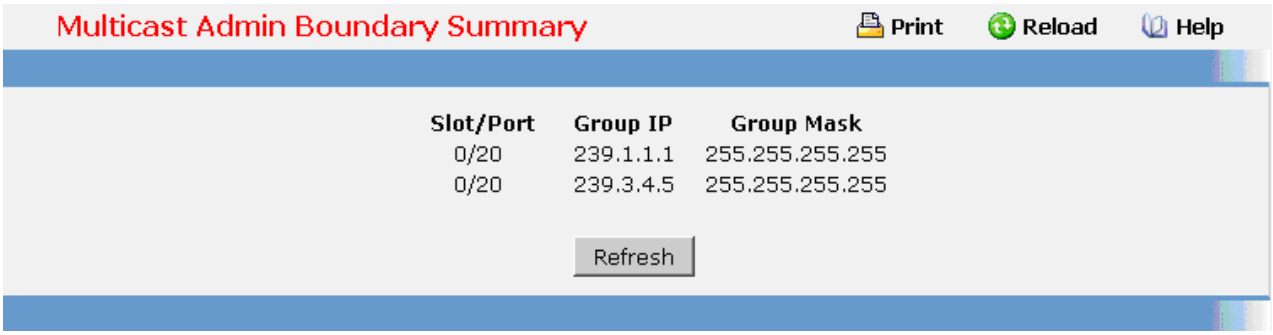
Slot/Port - The router interface to which the administratively scoped address range is applied.

Group IP - The multicast group address for the start of the range of addresses to be excluded.

Group Mask - The mask that is applied to the multicast group address. The combination of the mask and the Group IP gives the range of administratively scoped addresses for the selected interface.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.



8.2.6.4 Configuring Multicast Mdebug

Configuring Mrinfo Run Page

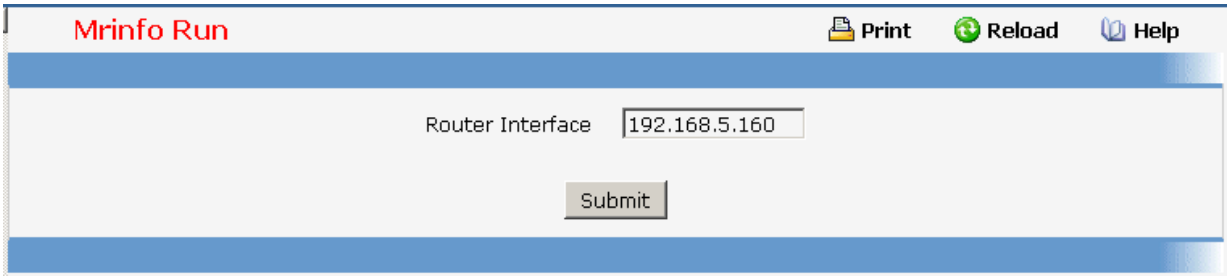
Use this screen to initiate an *mrinfo* command. You can use the *mrinfo* command to find out information about neighboring multicast routers. While you initiate the query using this screen, the results are displayed on the Mrinfo Show screen.

Configurable Data

Router Interface - Enter the IP address of the router interface for which you want to see the neighbor router information. If you do not enter an address the router will query itself.

Command Buttons

Submit - Initiate the *mrinfo* command on the router. If the *mrinfo* command completes successfully the browser will display the Mrinfo Show screen. If the *mrinfo* command fails, you will see the Mrinfo Run screen again.



Viewing Mrinfo Summary Page

This screen displays the results of an *mrinfo* command.

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Non-Configurable Data

Router Interface - The IP address of the router interface for which configuration information was requested.

Neighboring router's IP Address - The IP address of the neighboring router.

Metric - The routing metric for this router.

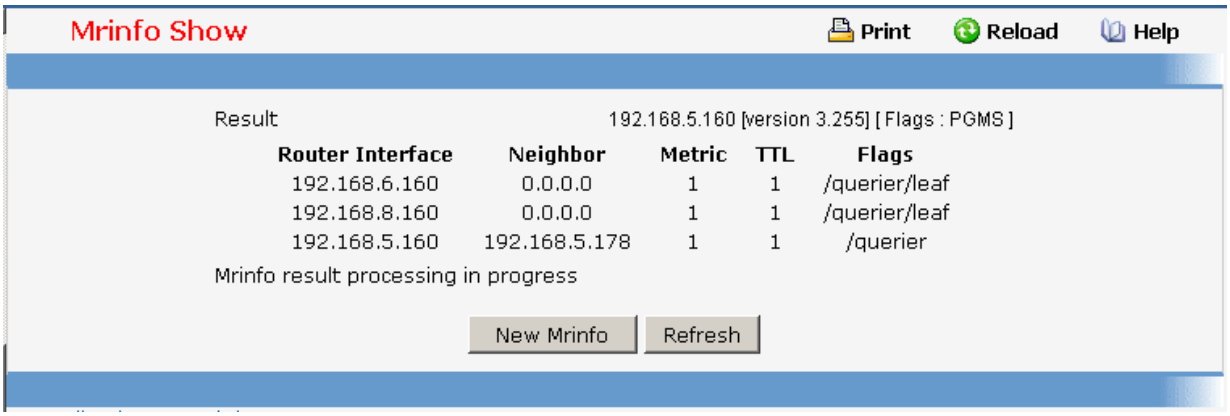
TTL Threshold - The time-to-live threshold on this hop.

Flags - The flags indicating whether the router is an IGMP querier or whether or not it has neighbors (leaf router).

Command Buttons

New Mrinfo - Redirect the web browser to the Mrinfo Run screen so that you can initiate another *mrinfo* command.

Refresh - Refresh the content of the screen with the latest data available on the router. Typically, it takes around 20 seconds to process the results after you have initiated the *mrinfo* command. The contents of the screen have to be refreshed to display the latest results.



Configuring Mstat Run Page

Use this screen to initiate an *mstat* command on the router. You can use the *mstat* command to see the hop-by-hop path taken by packets from a given multicast source to the destination. It also gives you information regarding packet rate and packet loss on the path.

Configurable Data

Source IP - Enter the IP address of the multicast-capable source. This is the unicast address of the beginning of the path to be traced.

Receiver IP - Enter the IP address of the host to which the *mstat* response will be sent by the last hop router. If a value is not entered, the IP address of the router interface through which the *mstat* will be sent is used.

Group IP - Enter the multicast address of the group to be traced. If you leave this field blank, the multicast address 224.2.0.1 will be used. Valid addresses are 224.0.0.0 through 239.255.255.255.

Command Buttons

Submit - Initiate the *mstat* command on the router. If the *mstat* command completes successfully the browser will display the Mstat Show screen. If the *mstat* command fails, you will see the Mstat Run screen again.

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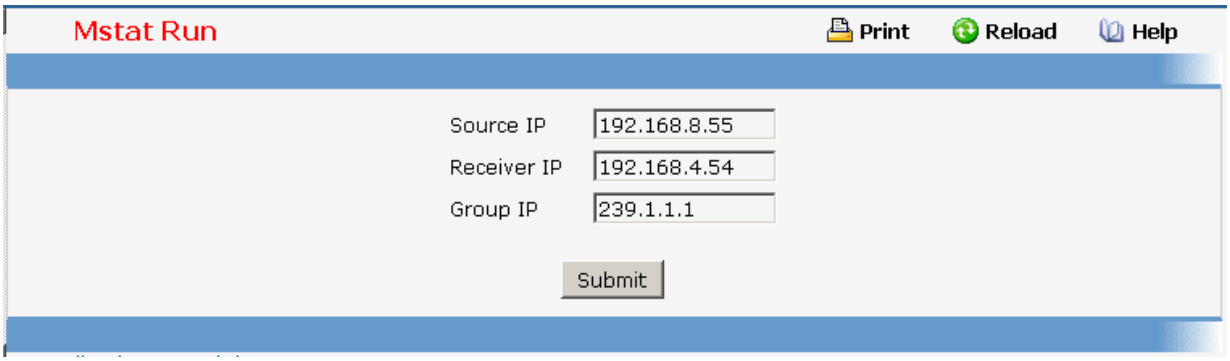


Viewing Mstat Summary Page

This screen is used to display the results of an *mstat* command.

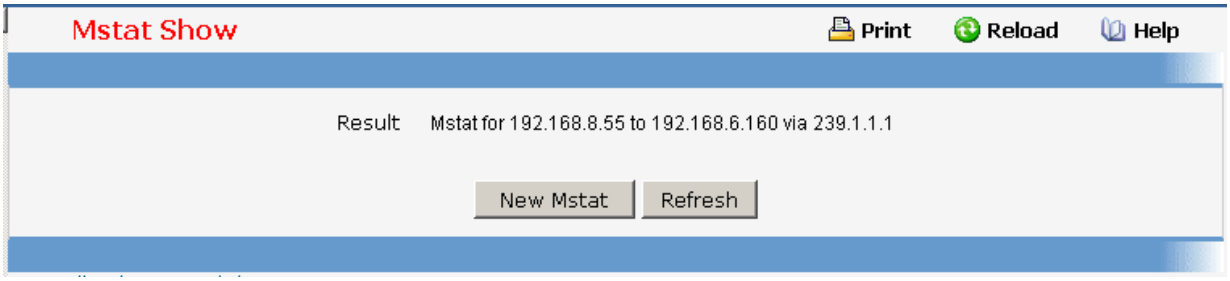
Non-Configurable Data

This screen shows the path taken by multicast traffic between the specified IP addresses. Forward data flow is indicated by arrows pointing downward and the query path is indicated by arrows pointing upward. For each hop, both the entry and exit addresses of the router are shown if different, along with the initial TTL required for packets to be forwarded at this hop and the propagation delay across the hop. The right half of the screen displays statistics for the path in two groups. Within each group, the columns are the number of packets lost, the number of packets sent, the percentage lost, and the average packet rate at each hop. These statistics are calculated from differences between traces and from hop to hop. The first group shows the statistics for all traffic flowing out the interface at one hop and in the interface at the next hop. The second group shows the statistics only for traffic forwarded from the specified source to the specified group.

Command Buttons

New Mstat - Redirect the web browser to the Mstat Run screen so that you can initiate another *mstat* command.

Refresh - Refresh the content of the screen with the latest data available on the router. Typically, it takes around 20 seconds to process the results after initiating *mstat* command. You must refresh the screen to display the latest results.



Defining Mtrace Admin Configuration Page

Configurable Data

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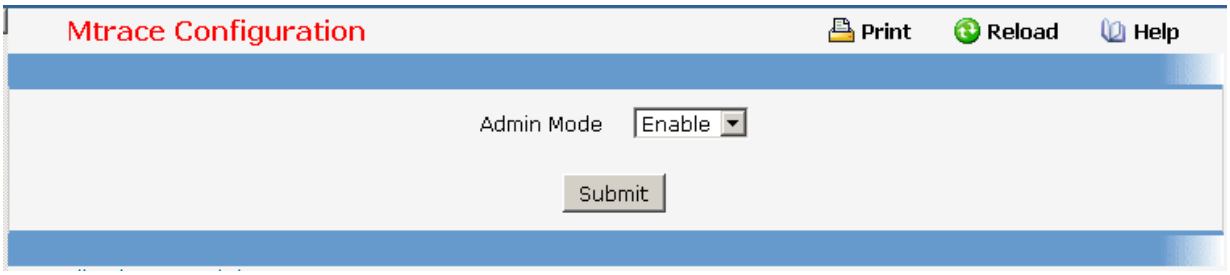
Admin Mode - Select enable or disable from the pulldown menu. If you select enable the router will process and forward *mtrace* requests received from other routers, otherwise received *mtrace* requests will be discarded. This field is non-configurable for read-only users.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Configuring Mtrace Run Page

Use this screen to initiate an *mtrace* command on the router. You can use the *mtrace* command trace the path from the source to a destination branch for a multicast distribution tree.

Configurable Data

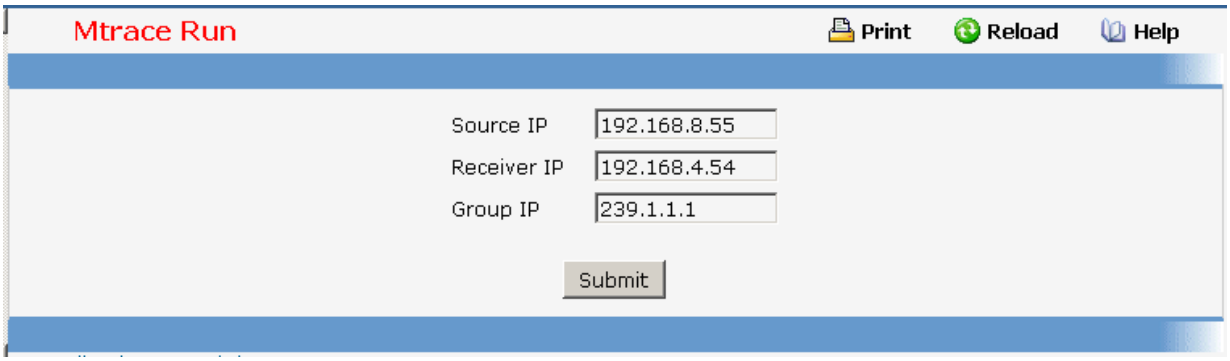
Source IP - Enter the IP address of a multicast-capable source. This is the unicast address of the beginning of the path to be traced.

Receiver IP - Enter the IP address of the host to which the *mtrace* response will be sent by the last hop router. If you leave this field blank, *mtrace* will use the IP address of the router interface through which the *mtrace* will be sent.

Group IP - Enter the Multicast address of the group to be traced. If you do not enter a valid address, multicast address 224.2.0.1 will be used. Valid addresses are 224.0.0.0 through 239.255.255.255.

Command Buttons

Submit - Initiate the *mtrace* command on the router. If the *mtrace* command completes successfully the browser will display the Mtrace Show screen. If the *mtrace* command fails, you will see the Mtrace Run screen again.



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Viewing Mtrace Summary Page

This screen displays the results of an *mtrace* command. The *mtrace* command is used to trace the path from source to a destination branch for a multicast distribution tree.

Non-Configurable Data

Number of hops away from destination - The number of hops away from the destination.

IP address of intermediate router - The IP address of the intermediate router in the path being traced between source and destination for the hop number in the previous field.

Multicast Protocol in use - The multicast protocol in use on this hop.

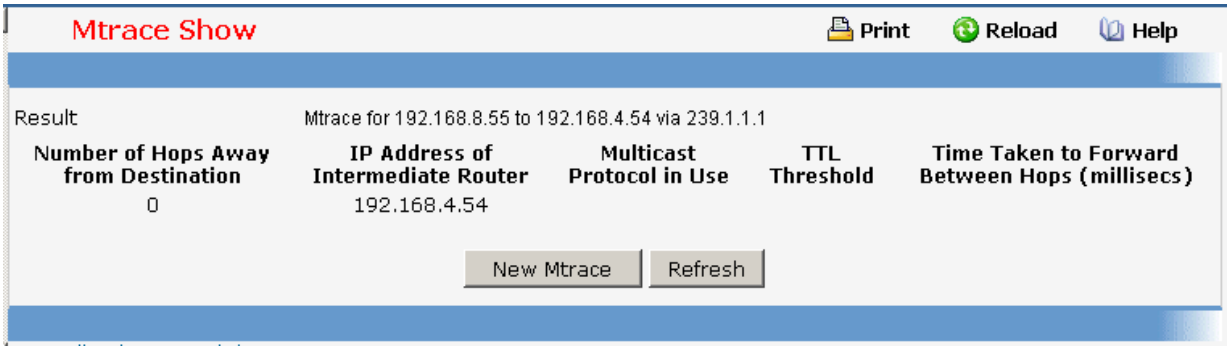
TTL Threshold - The time-to-live threshold on this hop.

Time taken to forward between hops - The time taken for the trace request to be forwarded from the previous hop to this hop.

Command Buttons

New Mtrace - Redirect the web browser to the Mtrace Run screen so that you can initiate another *mtrace* command.

Refresh - Refresh the content of the screen with the latest data available on the router. Typically, it takes around 20 seconds to process the results after initiating *mtrace* command. You must refresh the screen to display the latest results.



8.2.6.5 **Managing PIM-DM Protocol**

Configuring PIM-DM Global Admin Configuration Page

Configurable Data

Admin Mode - Select enable or disable from the pulldown menu to set the administrative status of PIM-DM in the router. The default is disabled.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

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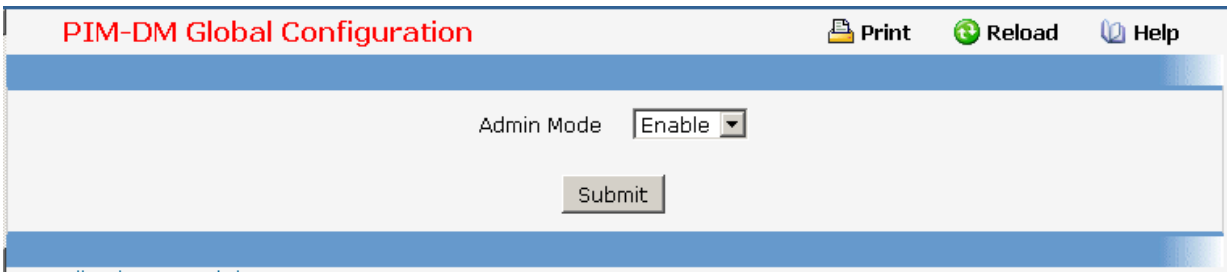


Configuring Interface's PIM-DM Configuration Page

Selection Criteria

Slot/Port - Select the Slot and port for which data is to be displayed or configured. Slot 0 is the base unit. You must have configured at least one router interface before configuring or displaying data for a PIM-DM interface, otherwise an error message will be displayed.

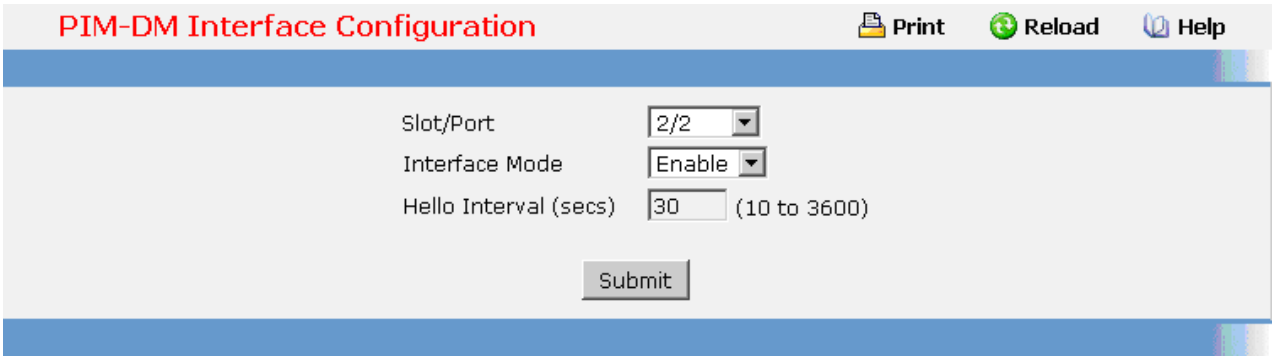
Configurable Data

Interface Mode - Select enable or disable from the pulldown menu to set the administrative status of PIM-DM for the selected interface. The default is disabled.

Hello Interval - Enter the number of seconds between PIM hello messages transmitted from the selected interface. The default value is 30. Valid values are from (10 to 3600).

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Viewing Interface's PIM-DM Configuration Page

Selection Criteria

Slot/Port - Select the physical interface for which data is to be displayed. There must be configured at least one router interface before displaying data for a PIM-DM interface, otherwise a message will be displayed.

Non-Configurable Data

Interface Mode - Displays the administrative status of PIM-DM for the selected interface. The default is disabled.

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Protocol State - The operational state of the PIM-DM protocol on this interface.

Hello Interval - The frequency at which PIM hello messages are transmitted on the selected interface.

IP Address - The IP address of the selected interface.

Neighbor Count - The number of PIM neighbors on the selected interface.

Designated Router - The designated router on the selected PIM interface. For point- to-point interfaces, this will be 0.0.0.0.

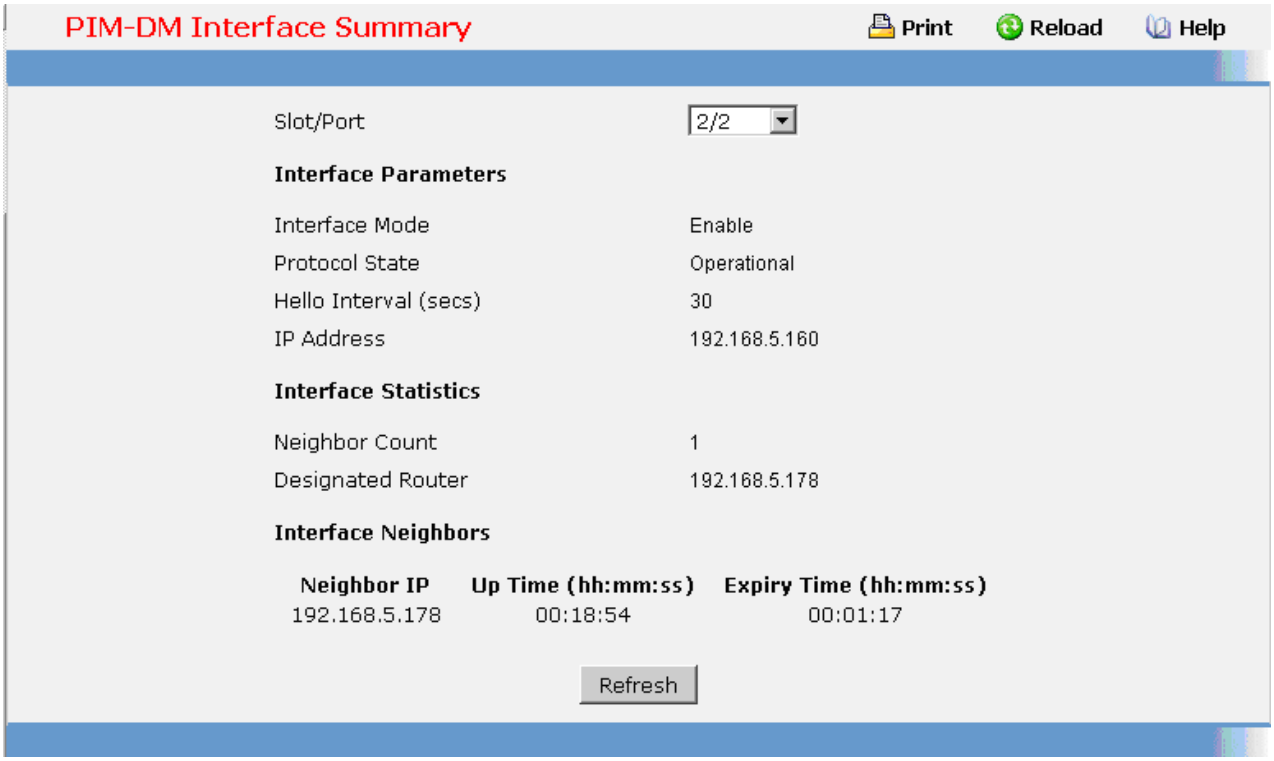
Neighbor IP - The IP address of the PIM neighbor for which this entry contains information.

Uptime - The time since this PIM neighbor (last) became a neighbor of the local router.

Expiry Time - The minimum time remaining before this PIM neighbor will be aged out.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.



8.2.6.6 **Managing PIM-SM Protocol**

Configuring PIM-SM Global Configuration Page

Configurable Data

Admin Mode - Select enable or disable from the pulldown menu to set the administrative status of PIM-SM in the router. You must enable IGMP before enabling PIM-SM. The default is disabled.

Join/Prune Interval - Enter the interval between the transmission of PIM-SM Join/Prune messages. The valid values are from (10 to 3600 secs). The default value is 60.

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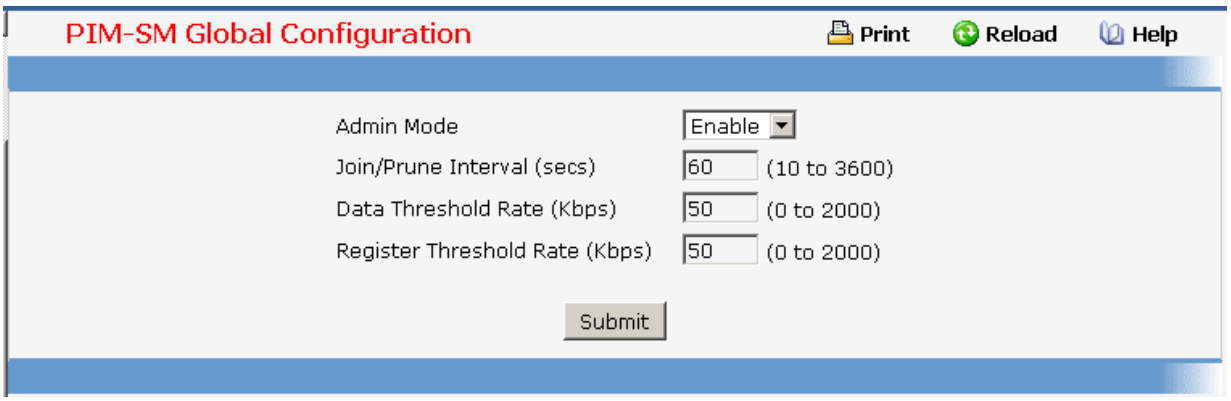
Data Threshold Rate - Enter the minimum source data rate in K bits/second above which the last-hop router will switch to a source-specific shortest path tree. The valid values are from (0 to 2000 K bits/sec) . The default value is 50.

Register Threshold Rate - Enter the minimum source data rate in K bits/second above which the Rendezvous Point router will switch to a source-specific shortest path tree. The valid values are from (0 to 2000 K bits/sec) . The default value is 50.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Viewing PIM-SM Global Configuration Page

Non-Configurable Data

Admin Mode - The administrative status of PIM-SM in the router: either enable or disable.

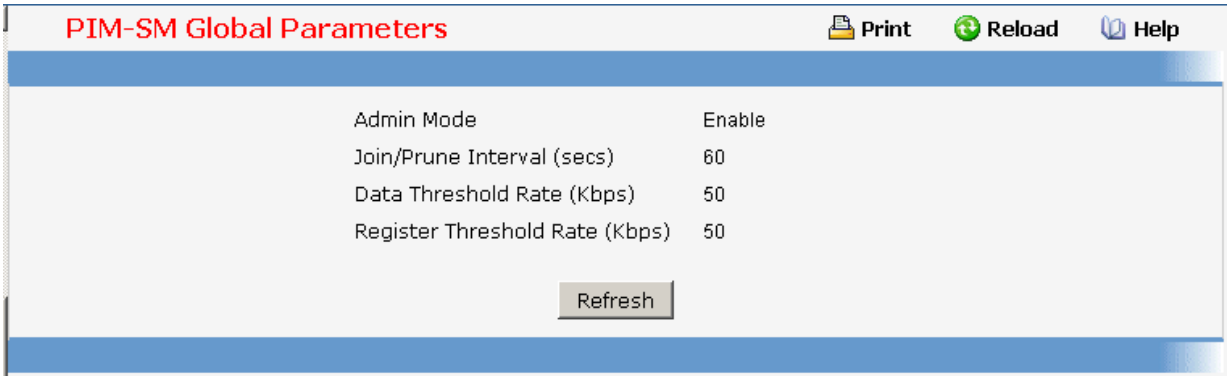
Join/Prune Interval - The interval between the transmission of PIM-SM Join/Prune messages.

Data Threshold Rate - The minimum source data rate in K bits/second above which the last-hop router will switch to a source-specific shortest path tree.

Register Threshold Rate - The minimum source data rate in K bits/second above which the Rendezvous Point router will switch to a source-specific shortest path tree.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.



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Configuring Interface's PIM-SM Configuration Page

Selection Criteria

Slot/Port - Select the slot and port for which data is to be displayed or configured. Slot 0 is the base unit.

Configurable Data

Mode - Select enable or disable from the pulldown menu to set the administrative status of PIM-SM in the router. The default is disable.

Hello Interval - Enter the time in seconds between the transmission of which PIM Hello messages on this interface. The valid values are from (10 to 3600 secs) . The default value is 30.

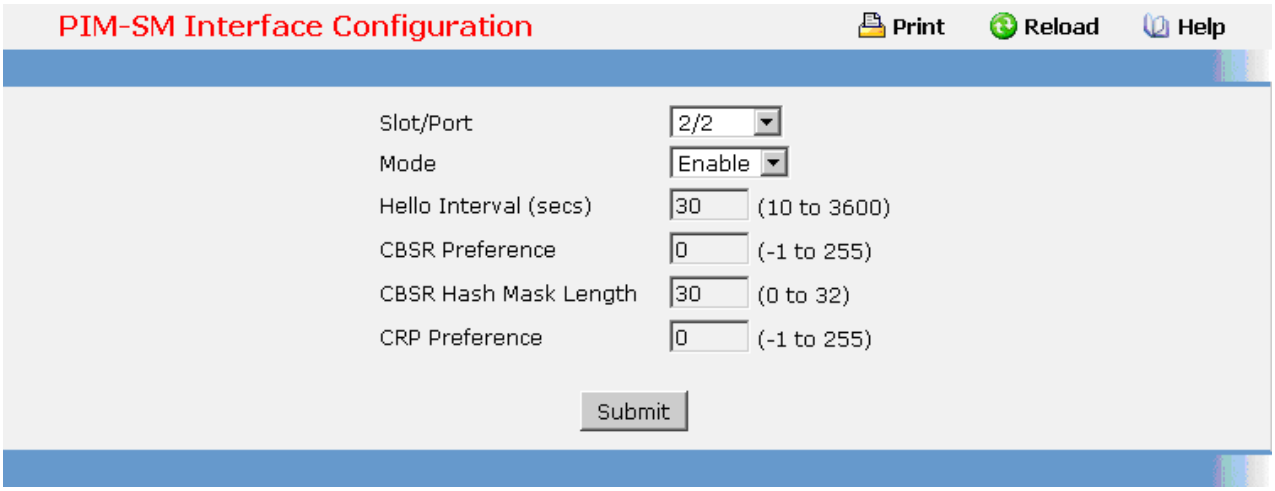
CBSR Preference - Enter the preference value for the local interface as a candidate bootstrap router. The value of -1 is used to indicate that the local interface is not a candidate BSR interface. The valid values are from (-1 to 255) The default value is 0.

CBSR Hash Mask Length - Enter the CBSR hash mask length to be advertised in bootstrap messages if this interface is elected as the bootstrap router. This hash mask length will be used in the hash algorithm for selecting the RP for a particular group. The valid values are from (0 to 32). The default value is 30.

CRP Preference - Enter the preference value for the local interface as a candidate bootstrap router. The value of -1 is used to indicate that the local interface is not a candidate BSR interface. The valid values are from (-1 to 255). The default value is 0.

Command Buttons

Submit - Send the updated configuration to the router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



Viewing Interface's PIM-SM Configuration Page

Selection Criteria

Slot/Port - Select the slot and port for which data is to be displayed. Slot 0 is the base unit.

Non-Configurable Data

Mode - The administrative status of PIM-SM in the router: either enable or disable.

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Protocol State - The operational state of the PIM-SM protocol on this interface.

IP Address - The IP address of the selected PIM interface.

Net Mask - The network mask for the IP address of the selected PIM interface.

Designated Router - The Designated Router on the selected PIM interface. For point-to- point interfaces, this object has the value 0.0.0.0.

Hello Interval - The frequency at which PIM Hello messages are transmitted on the selected interface.

CBSR Preference - The preference value for the local interface as a candidate bootstrap router. The value of -1 is used to indicate that the local interface is not a candidate BSR interface.

CBSR Hash Mask Length - The CBSR hash mask length to be advertised in bootstrap messages if this interface is elected as the bootstrap router. This hash mask length will be used in the hash algorithm for selecting the RP for a particular group.

CRP Preference - The preference value for the local interface as a candidate bootstrap router. The value of -1 is used to indicate that the local interface is not a candidate BSR interface.

Neighbor Count - The number of PIM neighbors on the selected interface.

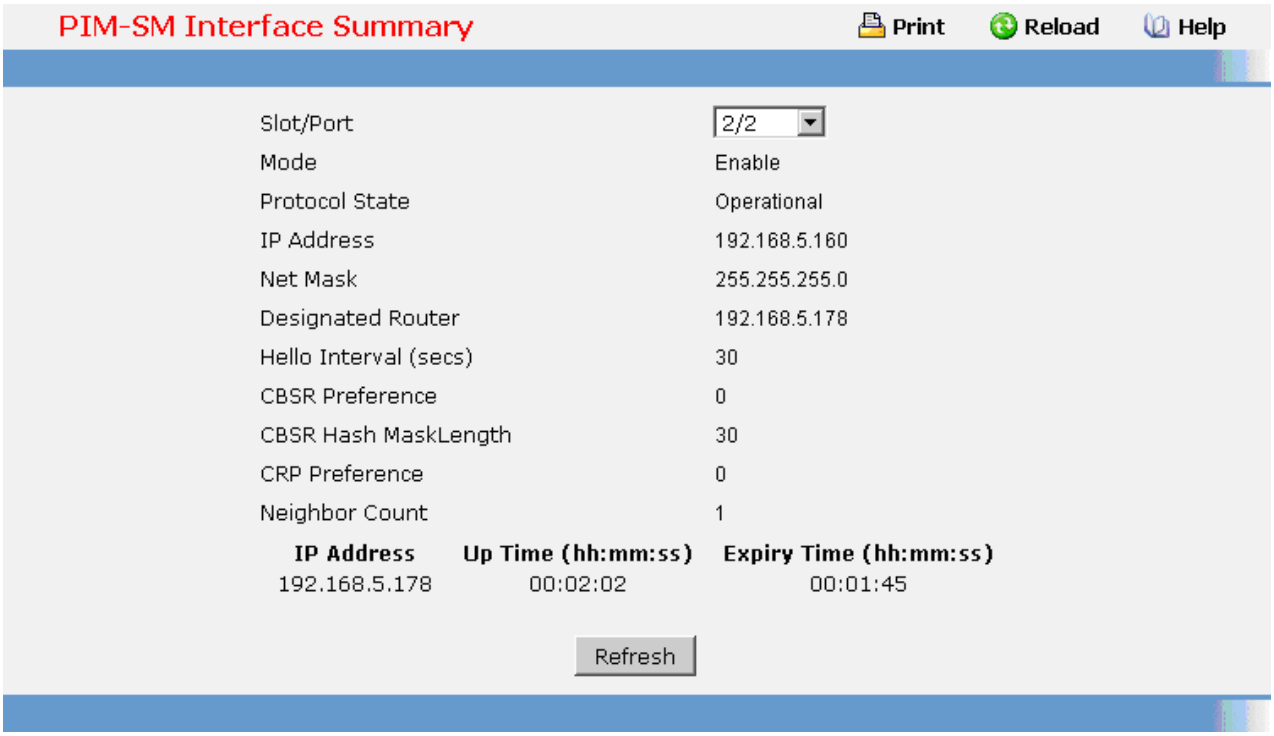
IP Address - The IP address of the PIM neighbor for this entry.

Up Time - The time since this PIM neighbor (last) became a neighbor of the local router.

Expiry Time - The minimum time remaining before this PIM neighbor will be aged out.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.



Viewing PIM-SM Component Summary Page

Non-Configurable Data

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Component Index - Unique number identifying the component index.

Component BSR Address - Displays the IP address of the bootstrap router (BSR) for the local PIM region.

Component BSR Expiry Time - Displays the minimum time remaining before the bootstrap router in the local domain will be declared.

Component CRP Hold Time - The hold time of the component when it is a candidate Rendezvous Point in the local domain.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.

Viewing PIM-SM RP Summary Page

Non-Configurable Data

Group Address - Displays IP multicast group address.

Group Mask - Displays Multicast group address mask.

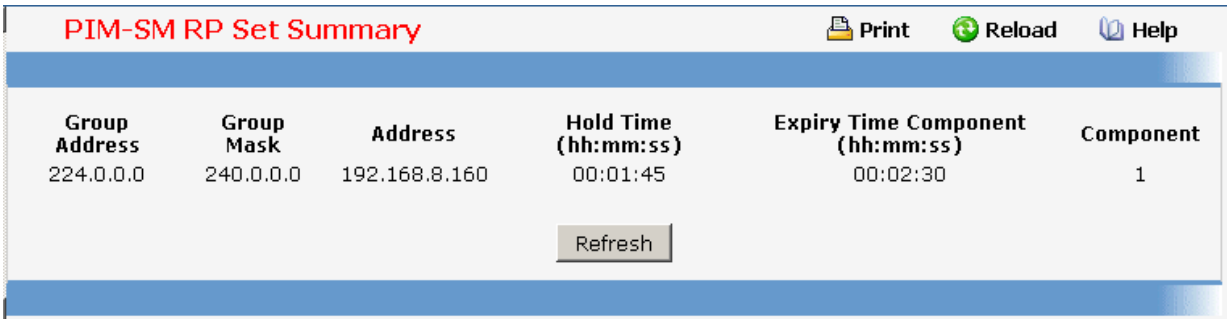
Address - Displays IP address of the Candidate-RP.

Hold Time - The holdtime of a Candidate-RP.If the local router is not the BSR, this value is 0.

Expiry Time Component - The minimum time remaining before the Candidate-RP will be declared.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.



Viewing PIM-SM Candidate RP Summary Page

Non-Configurable Data

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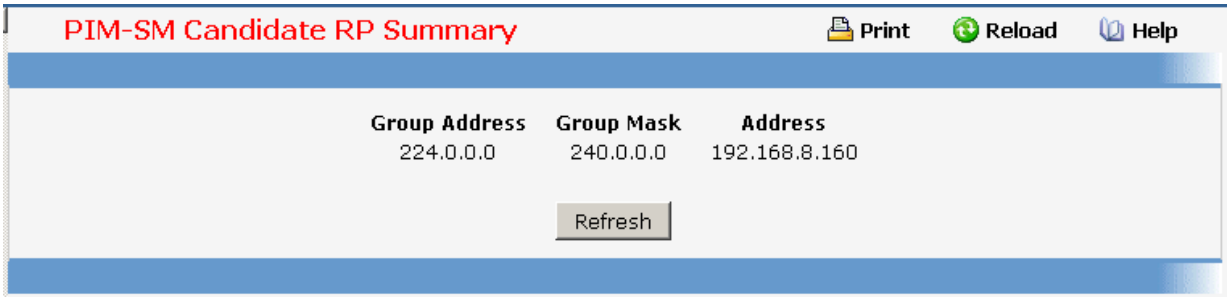
Group Address - The group address transmitted in Candidate-RP-Advertisements.

Group Mask - The group address mask transmitted in Candidate-RP-Advertisements to fully identify the scope of the group which the router will support if elected as a Rendezvous Point.

Address - Displays the unicast address of the interface which will be advertised as a Candidate RP.

Command Buttons

Refresh - Refresh the data on the screen with the present state of the data in the router.



Configuring PIM-SM Static RP Configuration Page

Configurable Data

IP Address - IP Address of the RP to be created or deleted.

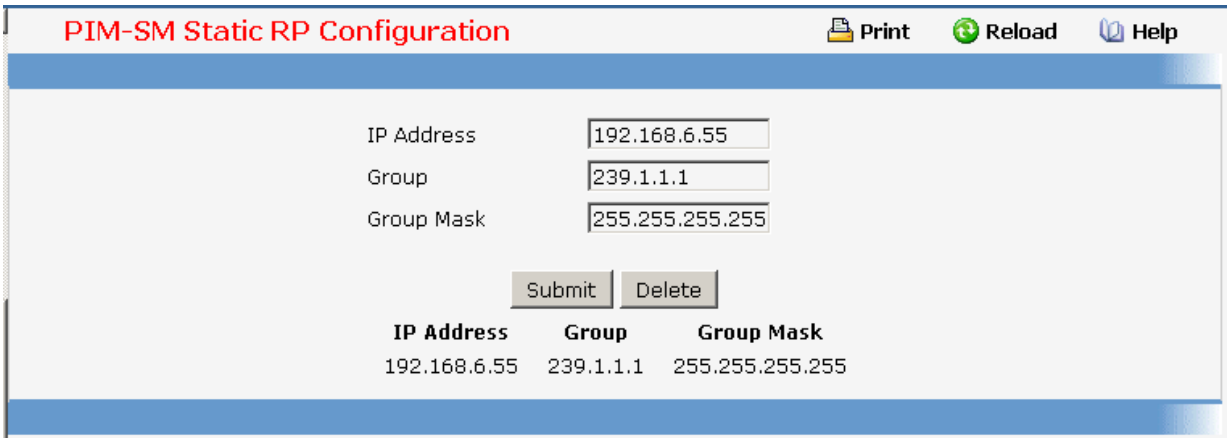
Group - Group Address of the RP to be created or deleted.

Group Mask - Group Mask of the RP to be created or deleted.

Command Buttons

Submit - Attempts to create the specified static RP IP Address for the PIM-SM router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.

Delete - Attempts to remove the specified static RP IP Address for the PIM-SM router. Configuration changes take effect immediately. These changes will not be retained across a power cycle unless a save is performed.



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